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Volume 21

JANUARY, 1938

Number 1

UNILATERAL AND BILATERAL CARCINOMA OF THE BREAST* (Including Paget's Disease)

Results Three, Five, Ten, Fifteen And Twenty Years After Operation

STUART W. HARRINGTON, M.D.

Rochester, Minnesota

CANCER of the breast is one of the most easily diagnosable forms of malignant tumor and it is probable that no form of cancer receives more surgical attention with such excellent results when treated by early primary radical operation. In spite of the fact, however, that countless patients, who otherwise would have died, have been operated on for cancer of the breast with excellent results, the general mortality from the disease has constantly increased, which indicates that there is an actual and not an apparent increase in the incidence of the disease.

The most important consideration in the treatment of cancer of the breast is early recognition of the disease and its immediate radical surgical treatment. There are no pathognomonic signs or symptoms by which all mammary malignant growths can be recognized. This, unfortunately, is particularly true of early lesions, and it emphasizes the importance of considering every lesion of the breast as being potentially malignant because delay in treatment may result in death from metastasis.

The educational program which members of the medical profession have for many years participated in, has been of great benefit in that a greater number of patients are seeking medical advice for lesions of the breast earlier in the course of the disease. This increases the responsibility of the physician, for lesions of the

breast are seen before the characteristic signs of malignancy are present and it is often difficult to distinguish benign from malignant lesions on the basis of clinical signs and symptoms. In those cases in which carcinoma is suspected and in which the diagnosis is definite, the subsequent course and planning of treatment should be carried out by one who is thoroughly familiar with the management of such lesions of the breast. The initial treatment is by far the most important procedure and the possibility of cure often depends on its effectiveness.

I have recently made another complete study of the cases of all patients with carcinoma of the breast who have been operated on at The Mayo Clinic from 1910 to 1933, inclusive. In an effort to make this study as accurate as possible, I have again reviewed the cases from a pathologic standpoint, and in a few cases in which the pathologic classification was not definite, additional microscopic studies were made which in some instances have changed the classification. There were relatively few of these cases; however, the figures which I have previously published have not been materially changed.

This present study comprises 4,628 cases in which patients were operated on in the period from 1910 to 1933 inclusive. The results have been tabulated in terms of "percentage survival rates" after operation, that is, the percentage of patients who were living, three, five, ten, fifteen and twenty years after operation. The five-year "percentage survival rate" is what is

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the annual meeting of the Minnesota State Medical Association, Saint Paul, Minnesota, May 4, 1937.

sometimes referred to in surgical parlance as a "five-year cure." A word about the way in which the calculations were made is in order: Patients who were treated for the requisite number of years prior to the time of inquiry, which was as of January 1, 1937, were first selected for the three-year survival rate, patients treated in 1933 or earlier for the five-year rate, patients treated in 1928 or earlier, for the ten-year rate, and so forth. Obviously, therefore, the three-year rate was calculated on the basis of a larger number of patients than the five-year rate, and the five-year rate was calculated on a larger number of patients than the ten-year rate, and so forth. Of the patients who were operated on, any patient who was traced for an insufficient number of years was considered to be "untraced" and was therefore excluded from the calculation. For instance in calculating the five-year survival rate, a patient who had been operated on five years prior to the time of the inquiry but who was traced only for four years after operation and who was living at that time was considered as "untraced," for one cannot know whether that patient did or did not survive until the fifth year after the operation. For the purposes of calculating the three-year survival rate that patient is traced, however, for we do know that the patient survived more than three years after operation.

An exhaustive effort was made to trace all patients. When patients were delinquent in answering routine follow-up letters, local health departments, vital statistics bureaus, and so forth, were consulted to learn whether there was any record of death. In the end, only a small number of the patients remained untraced, 97 per cent of the patients who were operated on five or more years before the investigation having been traced for a period of five years or more. It is to be noted that hospital deaths are not subtracted from the traced group, so that hospital deaths are counted as are other deaths in the first year after operation. In the 4,628 cases in which patients were operated on, which constitutes the total group dealt with in this paper, there were thirty-eight hospital deaths, or a rate of 0.8 per cent. In this paper, therefore, I shall report the three, five, ten, fifteen and twenty-year results in cases in which patients were operated on for unilateral carcinoma

of the breast and bilateral carcinoma of the breast, as well as the three, five, ten, fifteen and twenty-year results according to the grade of the malignancy in cases of unilateral carcinoma of the breast and the results of radical amputation for Paget's disease.

That malignant disease is not confined to any definite period of life is evidenced by the age incidence in this series. The youngest patient was seventeen, the oldest eighty-six years of age. In Table I is shown the age distribution of the patients for the entire series and also for those with and those without glandular involvement.

The results of operation depend on four important factors: (1) the extent of the disease at the time of operation, (2) the thoroughness with which the operation is performed, (3) the degree of the malignancy as measured by its list of pathologic grade at the time of operation, and (4) the age of the patient. Statistical studies are often misleading and may fail to give the true conception of the results obtained if proper attention is not paid to the specific character of the material dealt with. In studying carcinoma of the breast the first important consideration is the extent of the disease at the time of operation, and therefore the results will depend considerably on where the line is drawn between operable and inoperable conditions. I believe that this is one of the most important factors to be kept in mind in evaluating the results of statistical studies because, if only the small lesions without demonstrable axillary metastasis are considered surgical, the results would be unrepresentatively favorable. This method, however, would include only a relatively small number of patients, for the majority of patients present fairly well advanced lesions at the time of the initial examination. But even in this larger group of cases, in which there are more extensive lesions with ulceration and axillary metastasis, comfort and additional life can be given by proper surgical treatment and the patients deserve the benefit of this treatment.

There are varied opinions as to what constitutes operability. I will state briefly the criteria of operability which have been followed in this series of cases: Any lesion of the breast was considered to be operable if it was freely movable from the thoracic wall regardless of ulceration. In some cases even if there were cutane-

CARCINOMA OF THE BREAST—HARRINGTON

TABLE I. CARCINOMA OF BREAST (1910-1933)
Cases in Which Operation was Performed
Age Distribution

Age, Years	Total		With Glandular Involvement		Without Glandular Involvement	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
10-19	2	0.0	1	0.0	1	0.1
20-29	70	1.5	38	1.3	32	1.9
30-39	664	14.3	434	14.7	230	13.7
40-44	707	15.3	453	15.3	254	15.2
45-49	862	18.6	566	19.2	296	17.7
50-54	719	15.5	462	15.7	257	15.3
55-59	646	14.0	414	14.0	232	13.8
60-64	464	10.0	308	10.4	156	9.3
65-69	286	6.2	172	5.8	114	6.8
70-74	149	3.2	80	2.7	69	4.1
75+	59	1.3	24	0.8	35	2.1
Total	4628	100	2952	100	1676	100
Per Cent of Total	100		63.8		36.2	
Mean Age	49.7 yrs.		49.4 yrs.		50.2 yrs.	
Youngest	17 yrs.		17 yrs.		18 yrs.	
Oldest	86 yrs.		82 yrs.		86 yrs.	

ous nodules proximal to the tumor, regardless of the presence or absence of palpable axillary lymph nodes, the lesion was considered operable. The same view of operability was held in most cases in which supraclavicular nodes were palpable but were confined to one side. In addition, patients were accepted for operation if they had a diffuse type of malignant growth, if malignancy was associated with lactation and, in most cases, if malignancy was associated with pregnancy. Those conditions were considered to be inoperable in which a large growth was fixed to the thoracic wall and there was very extensive metastasis to the regional lymph nodes or distant metastasis to other parts of the body. A few patients with distant metastasis were accepted for operation because of exceptional circumstances.

As those indicated, it is difficult to draw any sharp line between operable and inoperable lesions, and in each case treatment must be according to the findings. I have accepted for operation all patients to whom, I felt, there

was a reasonable chance of offering comfort or greater length of life as well as those whose disease, I felt, there was a reasonable chance of curing. It may seem that these rules of operability have not been drawn strictly enough and that I am accepting for operation cases in which the growth is too extensive. This is a matter of opinion, however, and justification has been found in many cases in which the condition was thought to be absolutely hopeless before operation, but in which the patients have lived and enjoyed many years of comfort afterward.

I have ascertained for each year from 1910 through 1933 the percentage of cases in which there was lymphatic involvement at the time of operation. This percentage for the entire series was 64.0 and it has shown little variation in the last ten years of this period. In 1933, however, the percentage was 55.7. This relatively low percentage is very encouraging as it is the next to the lowest for cases presenting glandular involvement that have been seen since 1910, the lowest being 54.3 in that year. However, it is

CARCINOMA OF THE BREAST—HARRINGTON

TABLE II. CARCINOMA OF BREAST

(1910-1933)

Per Cent Survivals for Various Years after Operation*
Comparison of cases with and without glandular involvement

Axillary Metastasis	Patients Operated on	Patients Traced	LIVED		
			Years After Operation	Number	Percentage of those Traced
Present	2952	2882	3 or more	1208	41.9
Absent	1676	1624		1334	82.1
Present	2736	2666	5 or more	746	28.0
Absent	1520	1460		1052	72.1
Present	1963	1901	10 or more	297	15.6
Absent	1066	1011		544	53.8
Present	1219	1173	15 or more	117	10.0
Absent	696	649		275	42.4
Present	545	529	20 or more	39	7.4
Absent	329	307		100	32.6

*Investigation as of January 1, 1937. The three-year group comprises patients who were operated on three years or more prior to the investigation, the five-year group patients who were operated on five years or more prior to investigation, and so forth.

TABLE III. UNILATERAL CARCINOMA OF BREAST

(1910-1933)

Percentage Survival Rates for Various Years after Operation*
Comparison of primary and secondary operations

GROUP	Patients Operated on	Patients Traced	LIVED		
			Years After Operation	Number	Per Cent of those Traced
Primary operation	3883	3777	3 or more	2122	56.2
Secondary operation	488	475		255	53.7
Primary operation	3591	3482	5 or more	1500	43.1
Secondary operation	426	408		173	42.4
Primary operation	2572	2476	10 or more	703	28.4
Secondary operation	285	269		73	27.1
Primary operation	1624	1546	15 or more	332	21.5
Secondary operation	169	157		24	15.3
Primary operation	733	700	20 or more	118	16.9
Secondary operation	79	75		9	12.0

*Investigation as of January 1, 1937. The three-year group comprises patients operated on three years or more prior to investigation, the five-year group five years or more prior to investigation, and so forth.

CARCINOMA OF THE BREAST—HARRINGTON

TABLE IV. UNILATERAL CARCINOMA OF BREAST
(1910-1933)

Distribution by Grade of Malignancy

Grade of Malignancy	Total Cases		With Glandular Involvement		Without Glandular Involvement	
	Number	Per Cent of those Graded	Number	Per Cent	Number	Per Cent
1	129	3.8	10	7.8	119	92.2
2	427	12.7	183	42.9	244	57.1
3	1091	32.4	782	71.7	309	28.3
4	1721	51.1	1520	88.3	201	11.7
Total Graded	3368	100	2495		873	
Not Graded	1003		298		705	
Total	4371		2793		1578	

only the sixth time that the percentage has been in the fifties. Our experience at the clinic during this period indicates that the medical profession's educational program is hopeful of bearing results, although this percentage of 55.7 is still too high and indicates that we are seeing patients too late in the course of the disease to expect the best results from surgical treatment. Table II shows how much better the results are in cases in which patients are operated on before glandular invasion has occurred and again strongly emphasizes the importance of early operation. As has been pointed out in Table I, more than half the cases (64 per cent) presented evidence of glandular metastasis at the time of operation. It will be noted in Table II that the percentage of patients who were traced, and who were living three or more years after operation, is nearly twice as great for the group without axillary metastasis at the time of operation as for the group with axillary metastasis; for patients who were living five years after operation the percentage was about two and a half times greater; for patients who were living ten years after operation, three and a half times greater; for patients who were living fifteen years after operation, four times greater, and for patients who were living twenty years after operation four and a half times greater for those who did not have axillary metastasis at the time of operation than for those who did.

A comparison was made of the results of primary as opposed to secondary operations, and

the results for unilateral carcinoma are given in Table III. Those operations were considered secondary in which there had previously been a primary minor operation, elsewhere, for the same condition, and they comprised 11.2 per cent of all the operations for unilateral carcinoma. As Table III shows, the results for primary operations as indicated by the percentage survivals for the different years are better for the primary group than they are for the secondary group.

A study was also made to determine the results of amputation for unilateral carcinoma of the breast according to the grade of malignancy (Broders). This grading is based on the presence of cell differentiation, the greater the tendency of the cells to differentiate or to approach the normal, the lower being the grade of the malignancy. Lesions are graded on a basis of 1 to 4, grade 1 being the least and grade 4 the most malignant. A study was first made as to the relative frequency of each of the four grades of malignancy in cases of unilateral carcinoma. Not all the lesions in these cases were graded; 3,368, which comprised 77.1 per cent of the lesions, were graded, and 1,003, or 22.9 per cent, were not graded. Table IV shows the distribution of the various grades of malignancy for the entire group and compares the percentages in cases with and without glandular involvement for the various grades of malignancy. It is to be noted in this table that the high grades of malignancy comprise the largest percentage of all

CARCINOMA OF THE BREAST—HARRINGTON

TABLE V. UNILATERAL CARCINOMA OF BREAST
(1910-1933)

Percentage Survival Rates According to Glandular Involvement
and Grade of Malignancy*

Grade	Axillary Metastasis	Pa- tients Oper- ated on	Pa- tients traced	Lived 3 or More Years After Operation		Pa- tients Oper- ated on	Pa- tients traced	Lived 5 or More Years After Operation		Pa- tients Oper- ated on	Pa- tients traced	Lived 10 or More Years After Operation	
				Num- ber	Per Cent of Those Traced			Num- ber	Per Cent of Those Traced			Num- ber	Per Cent of Those Traced
1	Present	10	10	10	100.0	10	10	10	100.0	8	7	5	71.4
	Absent	119	111	107	96.4	97	91	87	95.6	49	48	41	85.4
2	Present	183	178	121	68.0	177	172	89	51.7	149	142	43	30.3
	Absent	244	236	210	89.0	211	202	163	80.7	93	87	48	55.2
3	Present	782	770	385	50.0	743	724	221	30.5	533	519	74	14.3
	Absent	309	303	241	79.5	252	247	154	62.3	127	122	55	45.1
4	Present	1520	1484	483	32.5	1362	1334	281	21.1	945	921	110	11.9
	Absent	201	197	134	68.0	173	168	96	57.1	115	112	44	39.3

*Investigation as of January 1, 1937. The three-year group comprises patients operated on three years or more prior to investigation, the five-year group five years or more prior to investigation, and so forth.

TABLE VI. BILATERAL CARCINOMA OF BREAST
(1910-1933)

Percentage Survival Rates According to Whether Carcinoma Developed Simultaneously
in Both Breasts or Not*

Group	Patients Operated on	Patients Traced	LIVED		
			Years After Operation	Number	Per Cent of Those Traced
Simultaneous	47	47	3 or more	15	31.9
Not simultaneous	210	206		150	72.8
Simultaneous	42	42	5 or more	8	19.0
Not Simultaneous	195	189		115	60.8
Simultaneous	31	30	10 or more	2	6.7
Not simultaneous	141	135		63	46.7
Simultaneous	19	19	15 or more	0	0.0
Not simultaneous	103	99		36	36.4
Simultaneous	14	14	20 or more	0	0.0
Not simultaneous	48	47		12	25.5

*Investigation as of January 1, 1937. The three-year group comprises patients operated on three years or more prior to investigation, the five-year group five years or more prior to investigation, and so forth.

CARCINOMA OF THE BREAST—HARRINGTON

TABLE VII. PAGET'S DISEASE OF BREAST
(1910-1933)

Percentage Survival Rates*

Axillary Metastasis	Patients Operated on	Patients Traced	LIVED		
			Years After Operation	Number	Per Cent of Those Traced
Present	11	11	3 or more	5	45.5
Absent	23	23		20	87.0
Present	7	7	5 or more	3	42.9
Absent	20	20		16	75.0
Present	2	2	10 or more	1	50.0
Absent	13	13		6	46.2
Present	0	—	15 or more	—	—
Absent	6	6		2	33.3
Present	0	—	20 or more	—	—
Absent	2	2		0	0

*Investigation as of January 1, 1937. The three-year group comprises patients operated on three years or more prior to investigation, the five-year group five years or more prior to investigation, and so forth.

cases, and that glandular involvement is present relatively less frequently when the lesion is of the lower grades of malignancy than when it is of the high grades. Thus for lesions of grade 1, only 7.8 per cent showed glandular involvement, whereas for lesions of grade 4, 88.3 per cent showed glandular involvement.

The grade of the malignancy is probably the most important indication as to the prognosis. This is again made more significant when considered in connection with glandular invasion. As has been previously shown, the higher the degree of malignancy the greater the percentage of cases with glandular involvement. The fact that the lesions in most of the cases I am dealing with were of a high grade of malignancy accounts for the high percentage of cases with glandular involvement, as these high grade lesions metastasize early to the regional lymph nodes. This again emphasizes the importance of early operation. The best results are therefore obtained in the case of lesions of lower degrees of malignancy without glandular involvement. The least satisfactory results are obtained in cases of grade 4 lesions with glandular involvement, and this holds true for the various years of survival after operation (Table V).

The results of the surgical treatment of bilateral carcinoma of the breast are shown for two groups: (1) those cases in which the carcinoma occurred in both breasts at the same time, designated as "simultaneous" carcinoma of the breast, and (2) those in which the carcinoma occurred in the second breast at a later time. The results for bilateral simultaneous carcinoma, which comprise forty-seven cases or 1.0 per cent of all cases of carcinoma of the breast, are, as would be expected, much less satisfactory than for those cases in which the carcinoma occurred in the breasts at different times. There were 210 of these latter cases, or 4.5 per cent of the total cases of carcinoma of the breast. The results in this latter group are better than would be expected, although it must be taken into consideration that these are the most favorable cases in the group, as many patients who later had carcinoma in the remaining breast had distant metastasis, which contraindicates any radical procedure on the remaining breast (Table VI).

Of all the cases of carcinoma of the breast in this series, only thirty-four patients, or 0.7 per cent, were classified as having Paget's disease. Like other forms of carcinoma, Paget's disease comes into existence by differentiation of epithe-

lial cells which appear to be practically limited in origin to protective or closely allied epithelium. It seems reasonable to classify Paget's disease with the squamous cell or epidermoid type of carcinoma. These cases are often associated with a ductal type of adenocarcinoma in the underlying mammary tissue. There is some difference of opinion pathologically as to whether malignancy originates in the epithelial structures or in the glandular structures in these cases; from a surgical standpoint, however, I believe that these patients should receive the same surgical treatment as those with adenocarcinomas. As will be shown in Table VII a relatively high percentage of these cases show glandular invasion, the percentage being 32.4. This is only half as great as that for all cases of carcinoma of the breast with glandular invasion, which was shown in a previous table to be 64.0 per cent. This proves very definitely that the lesions in these cases metastasize to the regional lymph nodes, necessitating a thorough radical procedure. As shown in Table VII, the results of radical amputation in cases of Paget's disease presenting glandular invasion are less satisfactory than in similar cases of the entire group of adenocarcinomas of the breast (Table II). In cases without glandular metastasis the results are more satisfactory for the three and five-year periods and not as satisfactory for the ten and fifteen-year periods.

Summary and Conclusions

A review has been made of all cases of carcinoma of the breast encountered at the clinic

from 1910 to 1933, inclusive. Of the total of 4,628 patients, 97.4 per cent have been traced three years or more and the results of operation have been determined for three, five, ten, fifteen and twenty-year periods in cases of unilateral carcinoma of the breast, bilateral carcinoma of the breast, and Paget's disease (Tables I to VII inclusive).

The best surgical results were obtained in cases in which metastasis to the lymph nodes had not taken place. In this series of 4,628 cases, 1,676 cases (36.2 per cent) did not present axillary metastasis at the time of operation. It was found that 82.1 per cent of these patients were living three years, 72.1 per cent were living five years, 53.8 per cent were living ten years, 42.4 per cent were living fifteen years and 32.6 per cent were living twenty years or more after operation. In cases in which there had been lymphatic involvement, the results were less satisfactory. There were 2,952 cases in this group, or 63.8 per cent of the total; 41.9 per cent of these patients were living three years, 28.0 per cent were living five years, 15.6 per cent were living ten years, 10.0 per cent were living fifteen years and 7.4 per cent were living twenty years after operation.

As is shown by this study, the important indications as to prognosis following surgical treatment are the extent of the malignancy at the time of operation, particularly as to the presence or absence of axillary metastasis, and the degree of the malignancy, as shown by the microscopic examination of the primary malignant lesion.

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NEW AUTOMOBILES AND NEW FRACTURES*

HARRY B. MACEY, M.D.

Rochester, Minnesota

TURRET tops, all steel bodies and shatter-proof glass have not compensated for fast driving, reckless driving and driving while drunk. This is attested by the 36,000 deaths from automobile accidents in 1936 and by the recent enactment in Minnesota of a law prohibiting speeds in excess of sixty miles an hour in the daytime or in excess of fifty miles an hour after dark.

By the title of this paper, I do not mean to suggest that the fractures now incurred in automobile accidents are unheard of. It is true, however, that, in comparison with former days, physicians are seeing more uncommon and more multiple fractures.

TABLE I. PATIENTS, FRACTURES AND TYPES OF ACCIDENTS

Patients	100
Fractures	164
Patients in overturn accidents	42
Patients in impact accidents	43
Patients in impact and overturn accidents	3
Type of accident unknown	12
Patients who had multiple fractures, 33 per cent	

The frame of the older type of automobile was chiefly of wood. There was very little steel support and the outcome of severe accidents was practically demolition of the car. Its parts were scattered, its doors were unhinged and, not infrequently, motors were driven into the front seat. As for the passengers, frequently they suffered compound fractures, together with laceration of soft tissue.

Today soft tissue is better preserved, but the feature of present day accidents which makes their human products more difficult to handle is the fact that the multiplicity of fractures, which previously has been mentioned, leaves the

patient in a state of more or less profound shock. The energy concealed in increased velocity has got to be absorbed somewhere.

Statistical Study

A statistical study of 100 consecutive cases, exclusive of those in which the skull was fractured, was made in an effort to give a cross section of the bones fractured and of the types of fractures sustained. The study is best re-

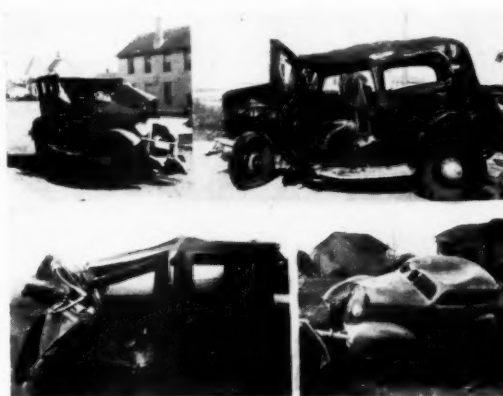


Fig. 1. Destruction of automobiles (above) in impact type of accident, and (below) in overturn type of accident.

viewed from the point of view of the types of accidents (Table I). Automobile accidents in general entail either impact, defined as striking together, or overturning. Impact accidents (Fig. 1, above) result from head-on collisions or from striking bridge abutments, trees or any object which stops or impedes progress. Overturn accidents (Fig. 1, below) commonly occur secondary to cars being sideswiped or forced off the road by inconsiderate drivers. Blowouts and falling asleep while driving are less frequent causes.

Thirty-three per cent of the individuals sustained multiple fractures; 100 patients sustained 164 fractures. Impact and overturn accidents occurred in about the same frequency. In our geographical district, with its long distances and high speed highways, a preponderance of over-

*From the Section on Orthopedic Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the annual meeting of the Minnesota State Medical Association, St. Paul, Minnesota, May 5, 1937.

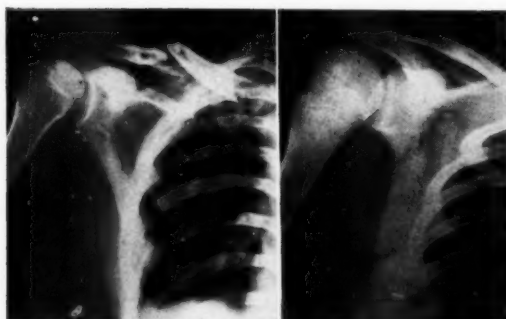


Fig. 2. Fractures commonly sustained in overturn types of accidents. *a*, Fracture of clavicle and scapula; *b*, fracture of scapula (the line across the surgical neck of the humerus is the epiphysis).



Fig. 3. Vertebral fracture commonly sustained in overturn type of accident.

turn accidents would be expected, whereas in large cities and more densely populated areas the impact type of accident would be expected to prevail.

As to bones injured, fractures of the ribs occurred in the highest proportion, 28.9 per cent (Table II). However, this high percentage is misleading in that only 17 per cent of the patients had fractures of the ribs: The high percentage is accounted for by the fact that usually several ribs were fractured. Twenty-four per cent of the individuals had vertebral fractures. These represented 20.2 per cent of the total number of fractures. The fact that a high per-

TABLE II. STRUCTURES FRACTURED

Structure	Per Cent
Vertebrae and processes	20.2
Ribs	28.9
Upper extremity and shoulder girdle	26.8
Lower extremity and pelvic girdle	22.3
Sternum	1.8
Total	100

centage of fractures occurred about the upper extremity and shoulder girdle, was attributable chiefly to the large number of clavicular and scapular fractures. Clavicular fractures were sustained commonly whether the accident was of the impact or of the overturn type. As compared with the upper extremity and shoulder girdle, the lower extremity and pelvic girdle suffered less. The sternum usually is thought of as an unusual situation for fracture to occur; yet the sternums of 3 per cent of the individuals were fractured.

Carrying the statistical study further, and reviewing the fractures in relation to the type of accident, several definite facts were brought out.

Overturn Accidents

Following overturn accidents, the frequency of fractures of the shoulder girdle (Fig. 2, *a* and *b*) and vertebral column (Fig. 3) was outstanding; 48.5 per cent of the fractures (representing 54.8 per cent of the patients) were of one of these structures (Table III). There was a tendency for these fractures to occur in combination, indicating that in this type of accident there is a common mechanism in their production. In the production of vertebral fractures of the compression type, and this is the type found after automobile fractures, force must be applied to the spinal column while it is in a flexed or jack-knife position; therefore, it would be logical to assume that, as the occupants are seated in a flexed posture, force is applied back and forth from the top of the car to the seat, as the car rolls over and over. This may further explain the situation of the fracture. Cervical fractures are produced by force applied from the top of the car to the skull, with the cervical portion of the spinal column flexed. In the pro-

NEW AUTOMOBILES AND NEW FRACTURES—MACEY

TABLE III. FRACTURES FROM OVERTURN ACCIDENTS

Structures fractured	Per Cent
Upper extremity and shoulder girdle	34.6
Clavicle 18 per cent	
Scapula 8.3 per cent	
Ribs	29.2
Vertebrae and processes	22.2
Lower extremity	7
Pelvis	4.2
Sternum	2.8
Total	100
42 patients sustained 72 fractures	

TABLE IV. FRACTURES FROM IMPACT ACCIDENTS

Structures fractured	Per Cent
Lower extremity and pelvic girdle	43.0
Femur 12.7 per cent	
Patella 9.5 per cent	
Ribs	27.0
Vertebrae	11.1
Upper extremity and shoulder girdle	18.9
Upper extremity 11.0 per cent	
Total	100
43 patients sustained 63 fractures	

duction of fractures of the thoracic and lumbar portions of the spinal column, direct force probably is applied to the shoulders, with the spinal column in a flexed, sitting position, or possibly the force is applied to the head, with the cervical portion of the spinal column in a neutral position. As the car continues to roll, the spinal column may assume different flexed positions and, with the reapplication of force, fractures may be produced at different levels.

In the production of clavicular fractures, indirect force is the most likely factor; probably, as the occupants are tossed from side to side, force is transmitted to the clavicle through the shoulder. These fractures are chiefly of the middle and outer third of the clavicle. Frac-

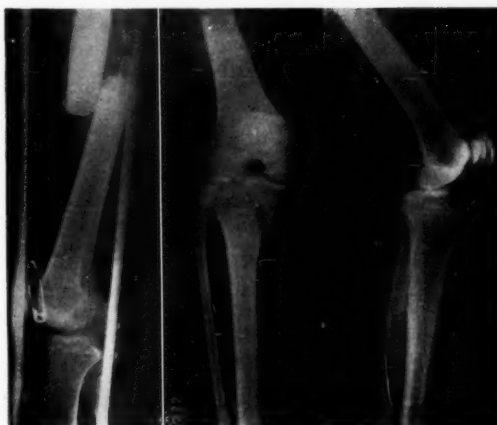


Fig. 4. Fractures commonly sustained in impact types of accidents. *a*, Fracture of shaft of femur; *b*, intra-articular fracture of knee; *c*, fracture of patella.

tures of the outer third probably occur as a result of force applied to the shoulder in a slightly downward plane; fractures of the middle third probably result from force transmitted through the shoulder in a horizontal, or in a slightly upward, plane.

The mechanism of the scapular fractures that occur in this type of accident is difficult to explain; however, I assume that force is applied directly to the body of the scapula rather than indirectly to the glenoid. This assumption seems reasonable because scapular fractures in this series involved chiefly the body of the scapula rather than the processes or glenoid.

Impact Accidents

In the impact accident, in contradistinction to the overturn accident, there was an outstanding occurrence of fractures of the lower extremities (Fig. 4, *a*, *b* and *c*). Forty-three per cent of the fractures (representing 46.5 per cent of the patients) were of the lower extremity and pelvic girdle. In Table IV, certain fractures of the lower extremity are mentioned; other fractures were of the leg, tarsus, hip, and ankle.

In many instances the position of the individual in the car could be learned. All of the patellar fractures, and 75 per cent of the fractures of the femoral shaft, affected occupants of the front seat. The patellar fractures probably result from striking the dashboard and the fractures of the femur result either from direct force transmitted from the dashboard to the

shaft of the femur or from indirect force exerted on the patella, with or without associated muscular action. An individual riding in the front seat probably would be aware of an impending accident and there would result a pro-

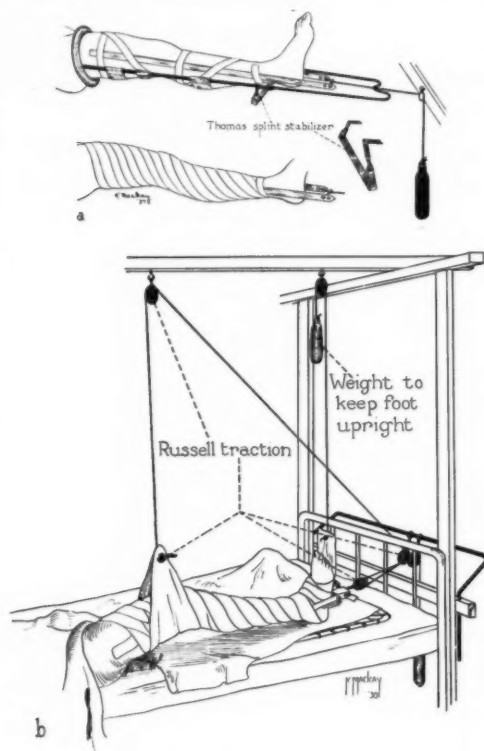


Fig. 5. Skin traction applied by means of adhesive tape and a, the Thomas splint; b, Russell method.

tective muscular reaction in which the feet would be pressed against the floor board and the muscles of the leg and thigh would be rendered tense. With the impact, the individual is thrown forward in accordance with the force of the impact. Thus it is conceivable that if the occupant is thrown forward, in a semi-crouching position, direct force on the knee, plus the powerful muscular action, could snap the femur. If the individual is thrown forward with the legs outstretched, direct force exerted by the lower margin of the dash may produce a fracture of the femur. The driver may sustain fractures of the femoral shaft from force exerted directly against the steering wheel.

The percentage of vertebral fractures sustained in impact accidents was about half that

sustained in overturn accidents. A large majority of fractures of the vertebrae in impact accidents probably result from the spine being snapped forward into flexion at the time of the impact. The percentage of fractures of the shoulder girdle and vertebrae sustained in overturn accidents also was only about half that sustained in impact accidents. Fractures of the shoulder girdle and upper extremities in the impact type of accident probably result from instinctive thrusting forward of the hand as a protective mechanism in bracing for the impact, with consequent direct or indirect exertion of force.

Treatment

In discussing the treatment of automobile fractures my remarks will be confined chiefly to the immediate care of these fractures. Not infrequently the patients are in poor general condition and treatment cannot be elective. Therefore, means of treatment or of protection of the fracture must be limited to those which will not make worse the general condition of the patient.

The Thomas splint, simple of construction and easy of application, is one of the most useful devices. It is made for use on the lower extremity but occasionally it can be successfully used in the immediate care of fractures of the upper extremity. The fixation and supporting functions of the Thomas splint often are employed in conjunction with skeletal or skin traction.

Skeletal traction can be facilitated by employment of the Kirschner wire. The wire can be inserted at the bedside, under local anesthesia. The sites of election for introduction of the wire are through the femoral condyles or tibial tubercle. By means of this wire, adequate traction can be instituted early, commonly as an emergency measure and, frequently, as an elective measure in cases of fracture of the femur. In the same manner, fractures of the leg can be treated by applying the traction to the calcaneus or to the lower third of the tibia just proximal to the ankle joint. Should the general condition of the patient permit an elective course of management, traction by Kirschner wire offers an excellent method of treatment of fractures that are compounded or associated with badly traumatized surrounding soft tissue.

Skin traction can be applied by use of adhesive

tape or moleskin, and is efficient for short periods with heavy traction, or for longer periods with light traction. It is well used in certain instances. The Thomas splint also can be used in the immediate care of fractures about the hip (Fig. 5, *a*).

A third method of skin traction, reported by Russell, can be applied without detriment to the patient's general condition (Fig. 5, *b*). This has been found to be effective in treating fractures about the tibial tuberosities of adults and fractures of the femoral shaft of children. It is most effectively used on children if applied bilaterally for unilateral fractures of the femoral shaft.

Fractures of the patella usually require open operation. This is particularly true of fractures of the patella acquired in automobile accidents, because of their comminuted nature. Emergency measures consist of splinting, and possibly of aspiration of the hemarthrosis. Surgical treatment, as employed today for fracture of the patella, consists of internal fixation. In one method of fixation that is widely used, fascia lata is passed through the fragments, or encircles the fragments, and is sutured in position; in another, a rustless steel wire is introduced anteriorly and encircles the fragments of the patella. In its insertion the wire loop is passed through the quadriceps, patellar tendon and lateral capsular expanse, or if preferred, may be passed through the bony fragments, thereby insuring stability. Should fascia lata be employed as a means of fixation it is advisable to repair the usually associated lateral tear in the expanse of the capsule, using either chromic catgut or strips of fascia lata.

Hyperextension, the treatment for compression fractures of the vertebral bodies, is best maintained by well fitting plaster-of-paris casts. The danger of injuring the spinal cord by hyperextension should be kept in mind, and the method should not be applied until roentgenograms have made it evident that this danger does not exist. Frequently the condition of the patient necessitates delaying the application of plaster-of-paris casts, in which case hyperextension should be instituted in some simple and convenient manner. In cases of fracture of the lower thoracic and lumbar portions of the spinal column, hyperextension can be attained by means

of rolled blankets, suspension slings (Fig. 6, *a* and *b*) or ingeniously devised frames. In cases of cervical fracture and in cases of fracture of the upper part of the thoracic portion of the column, traction by some type of head sling,

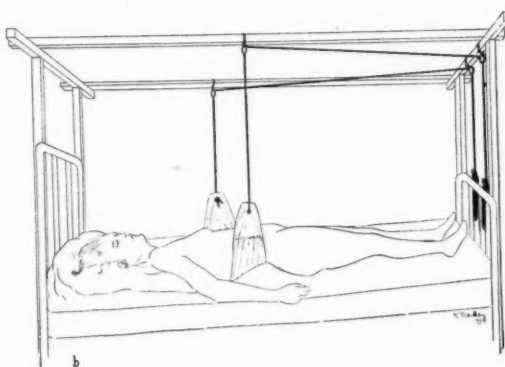
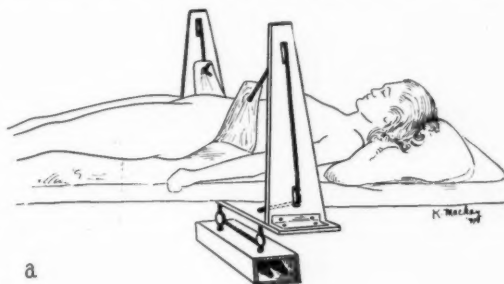


Fig. 6. *a*, and *b*, Different types of suspension sling for use in vertebral and pelvic fractures.

with or without hyperextension, can be instituted easily.

In considering vertebral fractures, I would urge that all complaints referable to the back, particularly a complaint of persistent soreness, be thoroughly investigated roentgenologically. Soreness, often mistaken for that of muscular contusion, may be the result of a fracture which can be revealed only by roentgenologic examination. I would urge that lateral roentgenograms always be included in the examination, for frequently a vertebra which appears normal in the anteroposterior roentgenogram will be found to be the site of a compression fracture when viewed laterally.

Fractures of the ribs, although painful, rarely are difficult to treat and simple immobilization for several weeks usually suffices.

Fractures of the shoulder girdle, so common in the overturn type of accident, usually can be

treated by elective measures from the beginning. In a rare case, surgical measures may be resorted to from the beginning. The clavicle most commonly is fractured in its middle third; less frequently in its outer third. In this series of



Fig. 7. Abduction humerus splint in treatment of clavicular fracture.

cases, none of the fractures were of the inner third. Treatment of fracture of the outer, or of the middle, third is directed toward correction of the deformity. This deformity usually consists in separation of the fragments, with the outer fragment carried downward by the weight of the upper extremity and the proximal fragment pulled upward by the sternocleidomastoid muscle. Correction is attained by elevation and extension of the shoulder. If manipulative reduction is employed for the simpler type of fracture, fixation is best afforded by a combined Sayre and Velpeau dressing. If delayed reduction is employed, and the fracture is simple, treatment can be carried out by the clavicular T splint, by clavicular rings, or by some type of special splint or some form of traction. If the fracture is comminuted, delayed reduction is in-

dicated. Manipulative procedures are rarely employed. A device which we, at the clinic, have found particularly effective for treatment of both simple and comminuted fractures of the clavicle is the abduction humerus splint, made in such a manner that the arm is held abducted about 110° and in slight extension (Fig. 7).

In scapular fractures, it is the body of the bone which usually is broken. Fortunately, the scapula is so placed that it is well protected posteriorly by muscles and anteriorly by the thoracic wall. Because of this, simple immobilization of the associated upper extremity for a period of two to three weeks usually suffices.

In this series, none of the sternal fractures required other than simple strapping by means of adhesive tape applied across the anterior thoracic wall. However, should gross displacement take place, open operation and reduction often will be required.

Comment

In closing, I would like to emphasize that in this review of 100 cases there occurred three sternal fractures and ten scapular fractures, fractures heretofore considered rare. Several textbooks either omit discussion of these fractures or give them slight mention. Furthermore, I would like to call attention to the fact that multiple fractures now are common results of automobile accidents. The overturn type of accident commonly produced fractures of the vertebra and shoulder girdle, whereas the impact type of accident commonly produced fractures of the lower extremities. Skull fractures, most commonly the cause of death in automobile accidents, have purposely been omitted in this discussion.

PERIPHERAL NERVE INJURIES*

ARTHUR A. ZIEROLD, M.D.

Minneapolis, Minnesota

INJURIES to the peripheral nerves, while not of frequent occurrence, are of importance by reason of the prolonged and many times permanent disability which accompanies them. The end-results following treatment are probably not

the best possible. This is true not because nerve injuries pass unrecognized or because the possibilities of treatment are not known but because most of us have no definite plan of procedure. Only too often we are confronted with permanent disabilities that might have been avoided had the patient been aware of what he might

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reasonably expect from treatment and, what is of prime importance, when that treatment should be undertaken. This paper will discuss briefly the development of a reasonable plan of treatment that will best conserve the factors necessary for success.

Nerve injuries in themselves are relatively simple in their nature but are often complicated by association with other injuries to tendons, muscles, vessels, and bones. A primary nerve injury may consist in nothing more than a concussion. This is manifested by a loss of function without structural damage. Next in order of severity is contusion of the nerve wherein there is actual cell damage and often interstitial hemorrhage. Last and most severe of the primary injuries is partial or complete section of the nerve trunk. Classed as secondary injuries are those compressions of the nerve resulting from the development of scar within the nerve trunk which frequently follows contusion or the external scar which results from lacerations of the surrounding tissue. Included in this and differing only in the character of the tissue is the compression of the nerve trunk by bone fragments or callus.

While symptoms of nerve injuries may by careful study be elaborated into a very complex syndrome, they may also be reduced to simple terms. When a nerve is injured there is a partial or complete loss of motor power or sensation or both. These are the primary signs of nerve damage and the areas affected can usually be identified with the affected nerve without a great deal of difficulty. Most prolonged study is undertaken in the attempt not to identify which nerve is injured but rather the nature and extent of the injury and its progression. If definite organic nerve injuries occur, secondary symptoms and signs will develop in the course of time. Vasomotor disturbances giving rise to changes in color and temperature develop so early as to be almost primary symptoms. The unopposed muscles give rise to deformities and finally, as atrophy and fibrosis of the muscles develop, these deformities become permanent. In the latest stages the involved joints become fixed by reason of muscle contracture or shrinkage of the capsule. Together with the muscular atrophy, atrophy of the skin frequently occurs and, with this, changes in nail structure and hair distribution. In some instances, particularly in the

lower extremities, ulceration may occur. These signs and symptoms are the gross outward evidence of nerve injury and may all or in part disappear with regeneration of the nerve. The manner of this may perhaps be best understood by a brief consideration of the histopathology.

What we class as peripheral nerves are those spinal nerve trunks consisting of sensory fibers from the posterior spinal roots and motor fibers from the anterior roots together with fibers communicating with the sympathetic ganglia. These are united in cable-like strands surrounded by a fibrous tissue sheath and subdivided by fibrous tissue septa. There are few if any purely motor or sensory nerves if we exclude the cranial nerves, although in some one element may predominate almost to the exclusion of the other. Although in our consideration of nerve injuries we are dealing with nerve trunks made up of numerous smaller fiber bundles, these fibers are all projections of cell bodies within the central nervous system or the sympathetic ganglia. Therefore, the changes which occur in peripheral nerve injuries must be considered in terms of a single cell. For example, an anterior horn cell of the spinal cord sends out its neuraxis which transverges the spinal nerve uninterruptedly to the muscle to which it is joined by specific end plates. This neuraxis is made up of numerous protoplasmic fibrils and is surrounded by myelin and the tubular sheath of Schwann. When section of the neuraxis occurs, degeneration promptly begins. This consists of fragmentation of the neuraxis fibrils and final decomposition attended by proliferation of neurilemma cells until the end-result is a tubular sheath filled with an undifferentiated, nucleated strand of protoplasm. This occurs almost simultaneously throughout the length of the distal fragments and is complete within two weeks. This state of affairs may persist unchanged for several months. As time progresses, however, the tubular sheath contracts until finally the degenerated distal fragment of nerve is represented by nothing more than a fibrous tissue strand with a few inclusions of protoplasm. As the distal fragment of nerve degenerates, the central stump also degenerates for a distance of two or three millimeters. Following this, however, regeneration of the nerve begins. The fine fibrils of the neuraxis proliferate and grow distally with rounded bulb-like ends, into the exudate at

the site of the injury. If uninterrupted by scar or undue separation of the fragments they pass into the previously mentioned neuraxis tube of degenerated nerve substance and grow in a rather regular manner toward the periphery. Because a sensory fibril may grow into a motor ending and vice versa, the mathematical chances of perfect anatomical regeneration are slight, but because of the great number of fibrils the chance of functional results is good, once the site of injury has been passed. It might be supposed that a nerve trunk with its included fibers laid down in a regular arrangement would not regenerate successfully after section unless each fiber tract had opportunity to grow into its proper and corresponding tube in the distal fragment. Because of the many intra-neural communications and plexuses this is found not to be necessary. It is, of course, obvious that the more nearly a nerve approaches an unmixed type the more satisfactory will be the end-result and the less will be the misfit of nerves and nerve endings.

If, however, a nerve be sectioned and the fragments separated, allowing scar tissue to intervene, the outgrowing fibrils in the central stump will turn upon themselves and form a loose network together with the newly formed scar, giving rise to a bulb-like stump which is the neuroma commonly found at operation. If this condition is allowed to persist for many months the distal degenerated portion of the nerve gradually contracts until the pathway for regenerating fibrils is lost. If instead of section the nerve has sustained a contusion with injury to nerve tissue the distal part may degenerate and regeneration from the proximal stump may take place uninterruptedly and successfully. On the other hand, if the contusion is severe, sufficient scar tissue may develop within the nerve to cause pressure enough to kill the newly growing fibrils and regeneration not only stops but what has previously grown following the initial injury is often lost. This process is duplicated in cases in which the nerve is compressed by bone or callus or other extraneous scar. Although the continuity of the nerve may be intact, function is lost by the injury of compression.

From this brief pathology, I believe, may be gathered the manner in which peripheral nerves

are injured and the mechanism of their regeneration. The next step is to make this information useful. The patient wants to know what can be done about his injury: what can be done to aid and insure recovery of nerve function.

The first and least formidable procedure is neurolysis. The injured nerve is exposed and freed from scar tissue or bone and relieved of compression. In so doing, continuity is not interrupted and fibril pathways are restored. If the nerve has been bruised and internal scar has formed in such manner as to block pathways or compress regenerating fibrils, relief may be obtained by the forcible injection of saline or even incision of the fibrous sheath and instrumental separation of the fibers. This procedure, of course, can rarely be used in old injuries. If the nerve has been sectioned or too much obstructing scar within or surrounding the nerve has been formed, resection and anastomosis of the nerve trunk may be performed. This is the most difficult and is only employed when other means fail. If the resected segment of nerve is too great to allow anastomosis, a transplant of nerve from other portions of the body may be required.

The next consideration in order is a plan of procedure. When shall we operate upon the nerve injury and what operation shall we employ? If a peripheral nerve has been seriously injured and there is a question whether or not regeneration will take place, the site of injury should be explored immediately. Although this is at times less simple than it sounds, it can be done carefully and the nerve exposed without injury. If, at the site of injury, there is no interruption of continuity, the nerve should be protected with fat or other material and the surrounding tissue carefully replaced. The patient should be regularly observed and deformities and contractures avoided by adequate splinting and massage. If at the end of six to eight months no signs of regeneration appear, the nerve should again be explored and the area of injury or scar excised and anastomosis performed.

If immediate exploration reveals a section of the nerve, anastomosis should be performed at once. In this way, prompt exploration discloses any actual nerve section sufficiently early to prevent secondary complications such as muscle and joint change or atrophy, and sufficiently

early to afford the best opportunity for complete nerve regeneration. If, on exploration, the continuity of the nerve is found to be intact, no damage is done by the exploration and conservative measures can be employed. On the other hand, if exploration is delayed several months awaiting regeneration (and, to be logical, this period should be at least six months) many operable cases will be unnecessarily handicapped, regeneration will be less prompt and sure, and many secondary complications will be developed which otherwise might have been avoided. Furthermore, the status of the nerve which does not require immediate suture will not be improved.

If confronted with a fresh wound and exploration reveals section of a nerve, the nerve should be united by suture even in the face of possible infection. There is everything to gain and nothing to lose. If the wound heals without pus formation, regeneration is well on its way with a minimum of scar and the best possible chance of success. If, on the contrary, the wound suppurates, the nerve ends are in better position than if allowed to separate and become imbedded in the resultant scar tissue. When sepsis subsides and the wound has healed, re-suture of the nerve is usually necessary but this cannot be done immediately. An infected wound should not be reopened within a six-months period. At the end of this time successful regeneration is still quite possible and the chances of a clean field are reasonably good.

Summary

From the foregoing plan of procedure what may be reasonably expected?

1. Roughly, 50 per cent of all injuries to the peripheral nerves recover function without operation.
2. Of the uncomplicated cases which require neurolysis or nerve suture, 75 per cent may expect functional recovery.
3. Of those cases which require nerve transplant, the percentage of success is considerably less.
4. Following nerve suture, the first evidence of regeneration seldom appears before four months and may be delayed two or three months longer.
5. Improvement may be expected for twenty-four to thirty months.
6. The results from primary suture are much better than the results from secondary or delayed suture: recovery is more often complete and the time of regeneration shortened and the secondary complications are obviated.
7. Of the various nerves subject to operation it is probable that one regenerates about as rapidly and as successfully as the other although from the published figures almost anything may be proven. It is probable, however, that the nearer a nerve approaches a pure type, either sensory or motor, the better are the chances of regeneration.

THE TREATMENT OF BURNS*

ROBERT F. McGANDY, M.D.

Minneapolis, Minnesota

ANY consideration of burns, like other injuries, from an industrial viewpoint should have the following objectives:

1. Prevention.
2. Lowering of the mortality rate.
3. Returning the patient to employment in the shortest possible healing period and with a minimum of permanent disability.

As a matter of fact there is no difference between these objectives from an industrial viewpoint than from that of private practice.

Ninety per cent of all burns are due to carelessness. Industry attempts to prevent burns as well as other accidents by:

1. Rigid physical examination of all applicants for employment.
2. Reexamination of all employees at stated intervals and following illnesses.
3. The activity of safety crews and safety appliances.

A similar campaign might be carried on for the prevention of so-called non-industrial burns. This might be done by impressing the lay people, particularly women, with the hazard of their

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clothing. Special precaution should be taken in protecting children in the preschool age.

Outside of industry, women are burned more frequently than men. The mortality rate in hospital cases in the past ten to twelve years has been reduced to one-half. It is significant, however, that 45 per cent of all deaths due to burns are in children between one and five years.

Historically, there is nothing new in the treatment of burns. At the present time, and for many years past we have been employing methods which were in vogue at one time or another, over many centuries, and which have been recently reintroduced and exploited. The treatment of burns really started with man's discovery of fire. Salves, ointments and oils have been used for ages, and their value can be attributed to the fact that anything covering a burn allayed pain. Hippocrates, in 430 B. C., used a combination of oil and resin in the treatment of burns. Alum and other astringents were used in the sixth century, A. D. The use of limewater and oil, which was the forerunner of carron oil, was recorded in the third century, B. C. Tait used paraffin in 1864 but it did not become popular until 1915. Picric acid was first used in 1864. Open air treatment was recorded as early as 1867. Water baths were used in 1858. Lister used boric acid compresses for burns exclusively and it is possible that he had the present popular infection theory for the toxemia of burns in mind at that time. The Chinese, in the sixth century, B. C., used a strong infusion of tea as wet dressings. One might say that one of the earliest treatments recently has become one of the most modern treatments. In general, one might say that burns have passed through periods of fads and fancy without much real investigation, until the last twelve years.

The various agents producing burns are too numerous and familiar to everyone to enumerate here. I am going to limit this paper to the consideration of superficial burns and scalds in general, rather than to those due to specific agents, as electricity, et cetera. Burns vary in extent and degree, depending primarily on the agent producing the burn. The American classification of burns into three degrees is the one most generally used, and I am sure all of you are familiar with it. I feel that Berkow's method of estimation of the extensiveness of surface burns showing the percentage ratio of parts

burned to the total body surface, is of great value. One must remember, however, that burns, regardless of their extent, are more serious in some localities than in others. This is especially true in burns about the genitals, neck and orifices. Briefly, the prognosis of burns depends on the burning agent; sex, age, and occupation of the burned patient; depth and extent of the region involved, as well as the physical condition of the patient at the time of the burn.

The general course of extensive superficial burns, and by this I mean burns involving 15 to 20 per cent of the body surface, can be divided into the following stages:

1. Initial shock.
2. Secondary shock.
3. Toxemia or sepsis.
4. Healing.

Initial shock, when present, begins immediately and is coincident with the occurrence of the burn. It is now thought that it is due to an upset of the vasomotor mechanism caused by afferent nerve impulses from the injured area. It is characterized by an anxious expression on the face and a moist grey skin. The temperature may drop slightly while the respirations become elevated and shallow. Blood pressure as a rule falls, but as the systolic and diastolic pressure usually fall together, there is little if any change in pulse pressure. This stage passes off as a rule with heat, opiates, et cetera.

Secondary shock usually follows in two to ten hours. There have been numerous theories advanced for this stage. The theory accepted now by most authorities is that of blood concentration. It is thought that the burn alters the permeability of the capillary walls. This, in turn, allows the escape of blood plasma from the body into the burned area. There is a definite measurable increase in blood viscosity. Blood concentration can be estimated by using a hemoglobinometer and this fact should be remembered, as it gives an easy method of determining the amount of fluid intake. As you know, a marked concentration of blood results in failure of circulation with an inefficient oxygen carrier. This means oxygen starvation of the tissues, resulting in falling of the temperature and finally death, if allowed to continue. One of the earliest signs of secondary shock is lowered pulse pressure, with or without a fall of the systolic pressure. A drop of less than 30 mm. in an adult, especial-

ly if the systolic is below 100, is definite evidence of early secondary shock. The pulse becomes rapid and, if at the same time it becomes feeble, it is an indication of advanced shock. The respirations become rapid as well. These in general are some of the common findings in secondary shock. As these conditions can be aggravated by exposure, coarse cleansing or scrubbing of the burned area, and the application of irritating antiseptics, et cetera, it is very obvious that one should forget the local burn and treat the patient systemically until the shock has safely passed or is under control.

In view of these facts, and others which I will take up later, I am sure you can readily see why I feel that lay people coming in contact with an extensive superficial burn should wrap the victim in a blanket or sheet, keep him warm and call a doctor or transport the patient to a hospital as soon as possible. Too often, some overwilling neighbor, employee or ambitious safety man pushes the poor victim deeper into shock by applying his or her favorite ointment, salve, paste, oil or other "household" remedy and then damages the patient further by showing the bystanders what a neat bandage he can apply. The real tragedy, however, is the fact that these applications must be removed by the doctor when the patient reaches him, so that the more necessary water-soluble escharotics can be applied. Fortunately the doctor can use nitrous oxide if the patient's condition does not permit otherwise. I cannot too strongly impress upon you my feeling that, from the standpoint of everybody concerned, the patient with extensive burns is best let alone, with the exception of course of wrapping him in a blanket or sheet and keeping him warm. A patient seen some time after a burn has been received should be given opiates to relieve pain and prevent the further development of shock.

When the patient reaches the hospital, he should be placed in bed under a cradle where the temperature is kept at about 90 degrees. Fluids should next be started. These can be given intravenously, but, if the patient's condition warrants, any method may be used. It is generally accepted that saline and glucose be used in order to take care of the blood chlorides lost and to protect the liver. If the patient's temperature is subnormal, these fluids are best given at 105 to 110 degrees. Blood transfusion,

except for sepsis, is best reserved for shock from trauma rather than burns. Many men recommend gum acacia in this stage as an initial measure and I heartily approve of it. A severe burn usually requires intravenous fluids for three days. A good rule for quantity is 1,000 c.c. per twenty-five pounds of body weight in twenty-four hours. A good adjuvant measure in the treatment of burns in this stage is the use of extract of suprarenal cortex. This is used in one c.c. doses and repeated at intervals. This extract, as in the case of Addison's disease, increases the efficiency of the circulatory mechanism and apparently checks some of the salt loss through the kidneys. So much for the control of fluid intake in combating blood concentration.

How may we now control fluid loss? It is definitely known that blood concentration and subcutaneous edema of the tissues following burns reaches its peak in twenty-four to thirty-six hours following injury. A hemoglobin determination may reach as high as 180. It has also been demonstrated that a third degree burn involving one-sixth of the body surface results in a fluid loss of 70 per cent of the total blood volume in twenty-four hours. This means that an adult weighing 65 kilograms having a blood volume of about 5,000 c.c. would lose 3,500 c.c. of fluid from the blood stream in twenty-four hours. Two out of three deaths in burns occurring in the first twenty-four hours, excluding of course those who die of primary shock and in those cases immediately hopeless, are attributed to the rapid concentration of blood and the great loss of blood plasma. So the ideal first dressing in extensive burns is one which not only allays pain by covering the burned surfaces but also, what is more important, prevents the loss of fluids from the blood stream. Too much credit cannot be given to Davidson, who, in 1925, called attention to the use of tannic acid in precipitating broken down burned tissue and thereby sealing off the capillary bed at the outset and preventing loss of body fluid. Time does not permit me to go into the details of this technic, and it is familiar to you. In review, may I state that most men now use tannic acid in a 10 per cent freshly prepared aqueous solution rather than the more dilute solution first advocated. There are many who use a 20 per cent solution, as coagulation takes place more rapidly with the stronger solution. This, however, does more damage to

the normal epithelial cells left in the burn, as I will explain later. Of the three methods of applying tannic acid, I believe the spray method far exceeds the other two. Immersion of the patient in a tub of tannic acid solution, although it can be done, requires a large amount of help and solution. Wet tannic acid dressings, like the objection to wet dressings in general, are painful to change because they adhere to the underlying structures and oftentimes reduce the patient's temperature and increase shock. The spray method is simple and can be carried out under a tent with ease or with the aid of a warm air blower or lamp in smaller areas, such as on the extremities. It is essential that the tannic acid result should be obtained as quickly as possible in order to retain body fluids. By the same token, tannic acid is of little value after fluid loss has reached its peak. For then, the reverse process takes place and fluid loss is not a factor. With the aid of heat and warm air, coagulation can be completed in six to twelve hours, and in eighteen hours at the outside. The use of silver nitrate with tannic acid is painful in extensive burns, and what is worse destroys unburned epithelial tissue which is invaluable for regeneration.

Picric acid in aqueous solution will coagulate tissue, but, due to its toxicity, I believe it should be limited, if used at all, to the ointment preparation for the emergency treatment of small burns and scalds. Alcohol, which is an excellent escharotic, I reserve for the treatment of minor burns. Here I feel it is of considerable value.

At this point, I wish to call your attention to a new group of escharotics, namely, the dyes, but before discussing these, I am first going to briefly consider toxemia. For many years, we have heard about toxic substances originating at the site of burns, circulating through the blood stream, causing elevation of temperature and other symptoms. Robertson and Boyd, in 1923, published an article describing primary and secondary proteoses. Various articles enumerate, in all, about ten or twelve so-called toxic substances. Many feel the evidence in support of the theory of absorption of toxins from the burned area back into the body is indefinite and contradictory. There has never been a constant toxic agent described nor has there been any agreement as to the nature of the toxin or the manner in which it works. The best evidence seems to be based

on clinical observation. Recently, Underhill and Kapsinow repeated the work of Robertson and Boyd, injecting an extract of burned skin into an animal and producing toxemia. By the same technic, however, they made an extract of normal skin and obtained the same results. On further analysis, they found the extract according to the original technic contained alcohol. As a control, therefore, they injected a like amount of alcohol into the experimental animal and got the same toxic results that they obtained from both the burned and normal skin. They concluded, therefore, that Robertson and Boyd's results were due to the alcohol. Underhill has injected whole blood from a burned patient into an animal and produced no toxicity. Harrison and Blalock grafted burned skin into a fresh wound on a normal dog and didn't produce toxemia. Later, Underhill, Hapsinow and Fisk injected methylene blue and another dye into burned animals and found the dyes rapidly went into the edema fluid but did not go back into the blood stream to any significant extent. They also injected five times the lethal dose of strychnine about the burned area and found no symptoms of poisoning in the animal. They concluded that, due to the change in capillary permeability, the body fluid shifted from within outward and that if methylene blue and strychnine could not get back into the body, how could some vague toxin be absorbed in sufficient quantity to account for the so-called toxemia of burns. Neither can we attribute toxemia to blood concentration. This is evidenced by the fact that fluids can be kept up to a normal level by watching the blood chlorides and hemoglobin, and yet symptoms of toxemia will appear.

It was in 1929 that Aldrich of Boston and Firor of Johns Hopkins University, because they were impressed by the fact that there was enough infection present in all large superficial burns to account for the symptoms of toxemia, began an investigation along this line. They were also impressed with the fact that practically no work had been done on the bacteriology of burns. They, therefore, took careful repeated cultures from burned areas and from the fluid under the blisters. In the first twelve hours, as a rule, they got no growth. After the first twelve hour period, it was found that in 100 per cent of patients severely burned and a large majority of those with minor burns, a growth of hemolytic streptococci

was found. The concentration of these organisms paralleled the increase in the signs of sepsis from the beginning of the toxic stage of the patient. At the end of forty-eight to fifty-six hours pure cultures were obtained and the organisms had outgrown all others. It is the opinion of Aldrich and Firor that a burn is a large open surgical lesion bathed in virulent pus. Moorhead has defined a burn as, "an infected wound due to heat." It is interesting that the general condition of an untreated burned patient has a course similar to many widespread hemolytic streptococcus infections. Additional evidence was obtained from blood cultures of patients after the toxic stage had started. These showed the same strain of streptococcus as was found on the burned surface. In fatal cases, cultures from the heart blood and lungs also revealed streptococcus hemolyticus. Davidson felt that tannic acid rendered the toxic substance in a burn non-absorbable, but Aldrich feels that the power of tannic acid lies in the formation of an eschar over a practically sterile burn and sealing of the burn, which prevents fluid loss and further contamination. Davidson also pointed out that the general condition of the patient depended on the condition of the eschar. The condition of the patient was good as long as the eschar remained dry. You have probably had the experience of having most large burns treated with tannic acid eventually become infected. These facts and the theory of infection caused Aldrich and Firor to look for a new escharotic which, at the same time, would prevent an infection. Such a substance, of course, would have to be non-toxic when used in large quantities for extensive burns. After considerable search they began to use gentian violet, which would not allow Gram-positive streptococci to grow even in the presence of proteins and could be used in large quantities. You, undoubtedly, have all used gentian violet in such infections as: impetigo, indolent ulcers, and certain ear conditions. The dye is not only an antiseptic, specific for streptococcus hemolyticus but also reacts with the superficial burned skin to form a light, tough, flexible eschar. The eschar is more apt to remain dry, and, what is more important, the patient is free from sepsis. Gentian violet is used the same as tannic acid, namely by the spray method. It can be applied every fifteen minutes to one-half hour and my experience with it has been very favor-

able. Aldrich later found that it had one weakness, namely, that it was not a specific against Gram-negative organisms, which enter burns secondarily. He then tried to find some one substance that would be highly antiseptic against both Gram-negatives and Gram-positives and would have the power of escharosis as well as being non-toxic when used for extensive burns. A search through the anilin dyes, as well as the azos and chloramids failed to reveal the answer. He therefore settled upon a mixture of gentian violet, brilliant green and neutral acriflavine as the answer to his problem. He uses gentian violet, three parts by weight; brilliant green two parts by weight; neutral acriflavine, one part by weight. Two grams of this mixture, commonly known as the Aldrich dye mixture, are dissolved in 100 c.c. of water and used in the same manner as gentian violet. Briefly, the patient is placed under a cradle and when shock is under control the local treatment is begun. Aldrich does not believe soap and water preparation is necessary with the dyes. Blisters are opened and loose shreds of epidermis are trimmed away. If ointments and oils were used before admission, these are removed by patting the burns gently with an ether sponge. Personally, I still use soap and water also, but heartily believe that if extensive debridement is necessary the patient should be put to sleep with nitrous oxide. The dye is then sprayed on and after it dries another coat is applied. This process is kept up until a good eschar is obtained. Pain usually disappears after the second application. Once the eschar is formed no further dye treatment is necessary unless the burn becomes secondarily infected. This is true, particularly in children where the eschar is torn off or in burns near the orifices. The eschar should be inspected every day, soft areas excised, and the dye reapplied rather than antiseptic solutions as in the case of similar situations with tannic acid. It should be kept in mind that softening of the eschar is not always due to infection in either the tannic acid or dye treatment. Necrosis from pressure and melting of fat from heat can also cause soft areas. It is the experience of all who have used the dye method that softening under the eschar due to infection is not nearly as frequent as in the case of tannic acid. In general, the advantages of the dyes over tannic acid is that the eschar with dyes is thin and pliable and is therefore more comfortable

and less liable to crack and allow secondary contamination. There is little if any antiseptic value in tannic acid, whereas the dyes are specific for the bacteria found in burns. This, in turn, lessens the number of pockets of infection so common in tannic acid treatment. It is a well established fact that tannic acid, although it will not affect normal skin with the cornified layer present, will kill the prickle cell and germinal layers if this layer is absent. This retards epithelization and increases the likelihood of the need for skin grafting. The dyes, on the other hand, do not kill any of the skin layers. For the same reason, the chance of scar formation is lessened. Both methods, however, have the common properties of saving lives by sealing off the capillary bed and thereby reducing shock, allaying pain, simplifying the care of extensive burns and reducing the number of dressings required.

For those who question the use of dyes alone, I find two methods of combining them with tannic acid being used. The burned surface is prepared as usual. In one method, the surface is first sprayed or painted with a 2 per cent aqueous solution of gentian violet. After drying, the tannic acid spray is used until an eschar is formed. The other method incorporates a 2 per cent aqueous solution of gentian violet in 10 per cent tannic acid. This solution is used as tannic acid or gentian violet alone. I have used both these methods more than the gentian violet alone or the newer so-called Aldrich mixture, which has only recently come to my attention. The only objection I find to the dyes is staining of the bed linen, but this is no worse than with mercurochrome and some of the other antiseptics we have all used.

Occasionally, an extensive burn comes to the surgeon which has been poorly treated or not treated at all and has survived the stages of shock. Infection is the paramount issue in these cases and it is best taken care of locally by clearing up the infection as rapidly as possible with saline or Dakin's compresses. In addition, it has occurred to me that if the toxic stage of burns is due to a streptococcus hemolytic infection, and I believe it is, the surgeon might treat cases with prontosil or any other brand of sulfanilamide. This is merely a suggestion as I haven't had much experience with the drug in this type of case and I can find no mention of it in the literature to date.

Concerning healing of extensive burns, there seem to be two procedures where escharotics are used. One method is to leave the eschar alone until it falls away, epithelization having been completed under it. The other method hastens this process by the early removal of the eschar and stimulation of granulation tissue and epithelization by other means. As granulation tissue is not ready for grafting for three or four weeks, I recommend the eschar be left alone until this time has passed, unless it comes away before. No harm is done in removing small areas of eschar for inspection purposes before this time, however. If one decides to go ahead, and each case is an individual one, the tannic acid eschar must be cut away, whereas the dye eschar can be easily loosened by saline compresses and then peeled off. In small areas a stimulating ointment can be used such as scarlet red alone or in combination with oxyquinolin. Epithelization can be promoted also, and I am personally impressed with thioglycerol for this purpose. In large burned areas grafting is eventually necessary, and I feel the sooner it is done, the better from the economic standpoint alone. Preparation of the area for grafting is a personal matter as a rule, but I feel Dakin's pack for twenty-four hours followed by saline packs is a very effective method. Here again, the method of grafting is a personal one with most surgeons and I will not go into it. Generally speaking, small full-thickness grafts seem to be the most popular.

The indications for skin grafting in burns are:

1. To cut down the size of the lesion.
2. To fill in areas when the burn has become indolent in its ability to spread epithelium.
3. To stimulate the spread of epithelium from the periphery of a burn.
4. To prevent contractures, especially over the flexor surfaces and where there are folds in crevices and motion.

In general, early skin grafting is indicated to cover with epithelium as much of the burned surface as possible and cut down the size of the burned area as soon as possible. Late skin grafting is used to complete epithelization where nature is slow, or to prevent disability from contractures.

There are a few general considerations in the treatment of extensively burned patients that I might mention in closing. The patient should be placed in the best position to prevent con-

fractures. This is especially true in burns about the neck, axilla and flexor surfaces of the extremities. Competent nursing care is very essential and the patient should be kept in the best mental attitude. Food should be adequate. Carbohydrates should be pushed where the metabolism is increased due to fever. All the vitamins are necessary and especially vitamin "C," if there is infection. Secondary anemia, which is common in extensive burns, should be watched for and taken care of by the administration of iron. Lastly, I wish to remind you that two-thirds of the body sulphur is in the skin. It is a clinical fact that patients on a high sulphur intake grow epithelium faster than those on a sulphur-deficient diet. This need is taken care of by adding two or three eggs to the daily diet.

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CERTAIN DERANGEMENTS OF THE KNEE JOINT*

C. C. CHATTERTON, M.D., F.A.C.S.

Saint Paul, Minnesota

IN dealing with the subject it will be quite impossible to consider more than briefly injuries that take place in and around the knee joint. We must reflect on the anatomy and physiology of the knee joint, discuss the symptoms and treatment and briefly the methods of disability rating. Personally, I like very much to consider disabilities of the knee joint in two classes, based on the clinical history: (1) disabilities that are likely to cause locking of the knee joint; (2) disabilities that do not cause locking of the knee joint.

The anatomy and physiology of the knee joint.—The knee joint is more than a hinge joint. It is a so-called gliding joint because with its power of flexion of 135° it also has a rotary power of 45° to 60° and a lateral motion usually of about 5°.

Because of the great freedom of motion controlled principally by muscular and ligamentous

restriction, the knee joint is not well adapted to stand stress and strain, especially rotary strain. In fact, rotation is not well controlled until the knee is in full extension, when the bony anatomy with the power of the quadriceps extensor holds the knee joint stable: Muscle control through the quadriceps extensor is the most important mechanism in maintaining stability of the knee joint, and muscle defense is the first buffer to stress and strain. After muscle defense is overcome, the ligaments and capsule next come into play, and extreme continuous force may stretch or tear the ligaments themselves or from their bony attachments, allowing extreme motion of the joint with resulting injury to the cartilage, the menisci, synovial lining, the fat pads, and the ligamenta alaria.

The lateral ligaments and capsule control lateral motion, except when the knee is in full extension. The crucial ligaments control the extreme anterior and posterior motion.

The semilunar cartilages by their shape tend

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to deepen the tibial tuberosities and make compensation through their slight motion for a better fit between the condyles of the femur and tibia, and it is believed that they also act as the spreaders of synovial lubrication and help prevent friction. The semilunar cartilages are maintained in position by the coronary ligament to which they are attached.

Abnormal Conditions Which May Produce Locking in the Knee Joint

1. Injury to the cartilages (menisci), external or internal.
2. Loose bodies or joint mice.
3. Slipping patella.
4. Damage to the fat pad.
5. Fracture of the tibial spine.

1. *Injuries to the Cartilage (external or internal meniscus).*—The type of injury may be a tear or split of a portion of the cartilage with or without tags: the entire cartilage may be dislocated into the intercondyloid notch, the so-called bucket handle type of injury; or the cartilage may be torn at the attachment of the coronary ligament, which may cause extreme freedom of motion to the cartilage so it can be displaced, causing locking of the knee joint without actual fracture or damage of the cartilage itself. The meniscus has no blood supply except at the junction with the coronary ligament, and actual repair of an injury to the meniscus proper usually does not take place.

The anterior portion of the meniscus is most subject to injury and most defects are found in the anterior half of the meniscus. It has been my experience that the internal cartilage is damaged in the ratio of approximately fifteen to one compared with the external cartilage.

The mechanism producing an injury to the cartilage is usually lateral strain or rotary strain or a combination of both, and along with any severe cartilage injury we frequently expect to find injury to the lateral ligaments.

The history of injury may be of severe trauma or the condition may occur after minor stress such as assuming a squatting position. The diagnosis of damage to the cartilage after one single injury is difficult, but after recovery from swelling and inflammation, and with a history of repeated catches and localized pain along the edge of the cartilage plus the so-called positive

Jones test (pain on making pressure over the cartilage and extension of the knee), negative x-rays which exclude loose bodies, dislocated patella, surgical inspection of the knee joint is warranted. The external cartilage frequently gives, with other findings, a musical sound or click upon examination. Recently Steindler has found that auscultation of the joint may be of value in diagnosing internal derangements of the knee joint, especially those of the cartilage.

2. *Loose Bodies.*—Loose bodies found in joints are usually composed of bone and cartilage and are most frequently associated with two conditions: (1) osteochondritis dissecans, which is a separation of a small amount of bone and cartilage from the articular surface; and (2) osteochondromatosis or synovial enchondromatosis. Rarely a loose body may result from the breaking off of a hypertrophic spur in osteoarthritis or after a fracture of the joint surface, or from an organization of clots of fibrin forming rice bodies in the joint.

There are several theories as to the cause of *osteochondritis dissecans*. Many feel that, because of its usual location at the site of greatest stress and strain, trauma is the sole cause. Fat or bacterial embolism is thought by some to be a causative factor. Low grade arthritis or a variant of arthritis deformans is considered by others as a predisposing cause.¹

The symptoms of trouble in the knee joint may be noted long before the actual separation of the loose body, which may take months or years, but after the body has become separated the spasmodic locking of the joint due to the mechanical interference of free motion in the joint is quite conclusive for diagnosis. In many cases it is possible by x-ray examination to discover the punched out area before the loose body has formed, and removal of the affected area at that time may prevent the formation of a number of bodies.

Osteochondromatosis is usually easily diagnosed by the roentgen ray because of the large number of loose bodies seen. Some are bone, some are cartilage, many are pediculated, many free and they usually pack the joint and mechanically block free motion of the joint and produce locking. The real cause of osteochondromatosis is unknown, but trauma and infection seem to be the likely causative agents.

3. *Slipping Patella.*—While external slipping of the patella cannot be classed as a true internal derangement of the knee joint, as this condition often produces a painful twinge and occasionally definite locking, I feel that the discussion here with conditions that produce similar symptoms is proper.

This condition is seen in children and women much more frequently than in men, and because cartilage injuries are rare in children, the diagnosis after careful analysis and description is usually quite easy. Slipping patella may be unilateral or bilateral and is usually associated with a mild knock-knee and in young individuals who have unusual freedom of joints. Something occurs in the knee that temporarily restricts the motion, is usually quite painful and at the same time it is noted that the patella has assumed a position on the outer side of the knee joint. There may be an instant of restriction of motion or the knee may remain locked until manipulation releases the patella. The accident is usually followed by a period of swelling and pain about the knee.

4. *Damage to Retropatellar Fat Pad.*—This condition is quite frequently seen in middle age. My experience is that the diagnosis of injury to the cartilage has been made and upon exposure of the joint the fat pad is found to be abnormal in shape, inflamed, thickened and in such position that it could easily interfere with the mechanical motion of the knee joint. It is indeed difficult to make a positive diagnosis of locking of the joint due to the fat pad until after exposure of the joint.

5. *Fracture of the Anterior Tibial Spine* or the anterior portion of the tibia may lock the knee joint and prevent extension. X-ray studies will at once show the bone block and demonstrate the pathological condition and the diagnosis in this injury is not usually difficult.

Disabilities That Do Not Cause Locking

1. Rupture of the lateral ligaments.
2. Rupture of the crucial ligaments.
3. Fracture of the patella.

1. *Rupture of the Lateral Ligaments.*—Severe sprains with minor symptoms about the knee joint are most common, but when either of the lateral ligaments has been severely damaged,

the stability of the knee joint is greatly impaired. Rupture of the internal lateral ligament is caused by overadduction commonly seen in football accidents of line play, clipping and tackling in an open field. The external ligament is frequently injured by accidents producing overabduction.

Sprains of either ligaments are usually only partial tears, and, while there is marked limitation of motion perhaps to a small arc, absolute locking is rare and is usually produced by some internal derangement of the structures of the knee joint.

Swelling, edema, limited arc of motion, localized pain over the external or internal ligaments or their attachments with increased lateral motion are the usual signs and symptoms of ruptured lateral ligaments. It is difficult at the time of injury to evaluate the amount of injury or tear to the ligaments, but with continued abnormal lateral motion, enough to disable the patient, an attempt to repair the damaged part should be made.

2. *Rupture of the Crucial Ligaments.*—Damage to the crucial ligaments may be caused by a combination of the same force and mechanism that causes damage to the cartilages. Usually torsion is necessary along with hyperabduction and adduction, to rupture both crucial ligaments. Rupture of the anterior crucial ligament allows forward gliding of the tibia on the femur, and when the posterior ligament is ruptured the tibia can be pushed backward, and if both are backward. This condition causes a feeling of ruptured there is great instability of the tibia as it may easily be pushed well forward and insecurity or giving way of the knee joint, but true locking is absent. Tenderness is found over the spine of the tibia with injury to the anterior crucial ligament, and just below and to the inner side of the patella upon flexion when the posterior crucial is damaged. Usually in this condition the lateral ligaments also are damaged, giving the objective and subjective findings of a relaxed, unstable knee joint.

3. *Fracture of the Patella.*—Fracture of the patella, complete or partial, may cause marked instability to the knee joint. If the fracture is complete the loss of ability to extend the knee is present. True locking is not seen, but swelling and injury to the soft parts may materially

affect the range of motion. The diagnosis of fractured patella is usually easy with the roentgen ray. Usually there is pain on attempting extension of the knee joint, with the point of tenderness over the injured patella.

Treatment

The old dictum that the knee joint should be opened with caution still holds good. Infection after operation is a surgical catastrophe, usually resulting in ankylosis or perhaps an even more serious result. But we feel that the knee joint has resisting powers against infection greater than was formerly realized, and infection even after frequent opening of joints is relatively uncommon.

If, after an accident, diagnosis is not certain, it is much better to wait and treat symptomatically, giving the joint a chance to recover spontaneously. Then if symptoms return at least a tentative diagnosis can be made and operation considered.

The danger of an unstable joint which at any time may give way, causing the patient to fall, cannot in the city dweller or in any individual be lightly dismissed. Repeated injuries, with internal derangement to the joint, may also cause degenerative changes quite as damaging to the function of the joint as the original injury.

When operation is considered, I feel that the patient should present himself at the hospital at least twenty-four hours previous to the operation, and should have a normal white count, normal temperature, and be free from demonstrable infection. The leg, thigh and knee should be carefully clipped and painted with merthiolate or 3 per cent iodine, after a soap, water and ether bath, and a sterile towel bandaged over the knee. In the operating room the application of merthiolate or iodine is repeated and the leg and thigh is carefully draped in such a manner that flexion and rotary motion of the knee joint can be performed.

Nothing should enter the knee joint except the instruments, unhandled gauze or small cotton pledgets; never the gloved finger. The choice of incision depends upon the type of operation considered, and in any knee joint condition the operator may find it necessary to inspect the knee through more than one incision. The small curved incision lateral to the patella gives

wonderful exposure to the anterior knee joint compartment, and the posterior exposure of Henderson and others will expose the posterior compartment satisfactorily. Lateral incisions are very valuable, but the lateral ligaments are to be avoided as much as possible. Upon opening the knee joint one is greatly relieved if the findings exposed prove the diagnosis. Apparently normal on the first inspection, the joint must be carefully explored, the cartilages pulled and moved about and search made for tags, splits and tears, the fat pad examined, the crucial ligaments, examination for loose bodies, and the defect in the cartilage from which they came. Often the anterior portion of the internal cartilage must be removed from its insertion and pulled forward to discover injury to the posterior portion of the cartilage. Some recommend entire removal of the cartilage if damaged. It has been our experience that if the anterior two-thirds or anterior three-fifths, especially if the cartilage is damaged in this portion, be removed, the symptoms will be relieved. If the cartilages prove to be absolutely normal or are found to be freely movable, I hesitate to remove them because of this free motion alone. The fat pad, which may be enlarged, red and inflamed, should be carefully examined, especially with the absence of damage to other internal tissues of the joint. Enlarged portions of the pad are removed freely with careful control of the hemorrhage usually found after cutting this pad.

Damage to the Tibial Tubercle.—If the tibial tubercle is loose, it is sutured into place by the method of Lee.²

Usually the crater in osteochondritis dissecans is carefully saucerized to prevent formation of new loose bodies in the joint, that is if the knee joint proper is opened. If the loose body is removed by incision through the pouch, the area of origin is not treated. Many condemn the refraining from treatment of the crater in osteochondritis dissecans, but I personally have simply removed loose bodies in this condition without new bodies forming and without further trouble to the patient.

Treatment of Injuries to Ligaments.—Following injuries to either or both of the ligaments, full extension of the knee joint should be main-

tained for at least three to four weeks without motion, and the limb held in a rigid apparatus. The apparatus should be of such character, however, that it can be removed so that massage and manipulation and contraction of the quadriceps extensor tendon can be a daily procedure. After removal of the rigid apparatus, a hinge splint or cage splint may be used for two or three months, and then a heavy, soft bandage can be used for protection. If the point of rupture can be demonstrated at the time of injury, early suture of the ligament is indicated, but if after usual care stability does not return, repair of the ligament is demanded.

Repair of Ligaments.—The internal lateral ligament is usually repaired by the use of the tendons of the gracilis and the semitendinosus muscle, freeing them from their insertion, bringing them forward and cutting them at the level of the attachment of the ligament on the condyle of the femur and either suturing or holding them with a metal staple in a groove made in the condyle. The free tendons are sutured to the tendon of the sartorius so the muscle power of these tendons is not lost. The Mauck method of suture or removing the tibial attachment and suturing the flap of bone down on the tibia seems worthy of trial in cases in which there is not a complete rupture of the ligament.³ There are many other operations for repair of the lateral ligaments.

The external lateral ligament is usually repaired by using a tube of fascia lata, attaching it to the external condyle of the femur in a small bone cavity, pulling it down along the course of the lateral ligament and suturing it to the head of the fibula under strong tension.

Rupture of the Crucial Ligaments.—Operations for repair of crucial ligaments are rare because repair or a fair degree of stability returns after conservative treatment. Like treatment for lateral ligaments, prolonged immobilization in the greater number of cases brings satisfactory results. If, in spite of the usual conservative treatment, marked instability is present due to rupture of the anterior or posterior crucial ligaments, operation may be contemplated. Most of the operations are copied after the procedure made standard by Hey Groves, that is the use of a strip of fascia lata inserted to take the place

of the ruptured ligament. Recently Cubbins and Campbell have perhaps improved the original plan to perfect treatment in this serious injury.⁴

Slipping Patella.—Habitual outward dislocation of the patella is as disabling as other derangements of the knee joint and may prevent the individual from competing in sports or doing manual labor. The old method of Goldthwaite in transferring the tibial tubercle with the attached patellar tendon to the inner side of the tibia is a tried and known procedure. In young children and in adolescents my operation of choice has been reefing of the internal capsule of the knee joint with a strip of fascia attached to the patella and the internal condyle of the femur, the so-called Mouchet operation. Recently Ober has observed an abnormal relationship between the iliotibial band and the patella and concludes that recurrent dislocation of the patella is a mild congenital displacement of the patella. He uses a flap of this band after dissecting loose from above the patella and suturing it through a small tunnel cut into the inner side of the tibia. The operation relieves the pathological anatomy and supplies a tendon which maintains the normal position of the patella.⁵

Fractured Patella.—Fracture of the patella with separation requires an operation. Some suture only the capsule, others suture the bone, and a combination of the two methods may be used. Fascia, wire, Kangaroo tendon, and heavy chromic catgut may be the choice of materials used as sutures. Chip or split fractures or comminuted fractures without misplacement are often treated and successfully by apparatus.

Postoperative Treatment

After inspecting a joint for a loose body or removal of a cartilage, care should be taken in closing the wound layer by layer, synovia fascia, capsule fascia and skin. A dry dressing, covered by many layers of sheet wadding, is held in place by a bandage and supported by adhesive. Motion is not restricted and after three or four days is encouraged. Weight bearing is usually allowed after seven days, stitches are removed on the eighth day, and the patient leaves the hospital on the tenth or twelfth day. A soft supporting bandage is worn for two weeks more. Motion is encouraged, and heat and gentle mas-

sage along with active motion may be given for a week or ten days after the hospital discharge with advantage to the patient.

Treatment After Injuries to Lateral Ligaments, crucial ligaments, slipping patella, or evulsion of the tibial spine, requires absolute fixation usually with a splint or a bivalved cast. About the eighth day the stitches may be removed and the retentive apparatus removed for massage, baking and contraction of the quadriceps extensor tendon, except in the case of fracture of the patella. Absolute fixation is necessary in soft parts injuries for at least three or four weeks, followed by supportive apparatus. In bony injuries six to eight weeks or even more of fixation are necessary followed by supportive apparatus. In either case gentle massage and manipulation over the ligaments and soft parts is indicated early.

The Evaluation of Disability after an injury to a knee joint in Minnesota is enumerated in percentage of loss of function of the limb as a whole. A given percentage of loss of function after injury in any case is largely a personal opinion, as evidenced by the frequent discussions before the Industrial Commission. Percentage of disability depends upon the finder's analysis of any given case, usually upon the function of the injured member.

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AN IMPROVED TREATMENT FOR OS CALCIS FRACTURES*

O. W. YOERG, M.D.

Minneapolis, Minnesota

BY the use of a method evolved about three years ago we have been able to obtain improved anatomic as well as functional results and, in the ordinary type of os calcis fracture, have been able to return men to work within three months from the time of reduction. In the more severe injuries, particularly those in which there has been a crushing of the posterior joint surface and in which the heel has been driven up and the angle either lessened or lost, convalescence has been slightly increased. But in most of these cases the men have been returned to work within four or five months from the time of reduction.

The method that we are employing consists of manually disimpacting the fracture, bringing the heel down by pulling the sole of the foot, with a sudden thrust, against a firm vertical bar, and the use of an os calcis compression clamp to overcome the broadening of the heel and to replace the loosened bones to their normal or

near normal position; this followed by the application of a well molded boot cast.

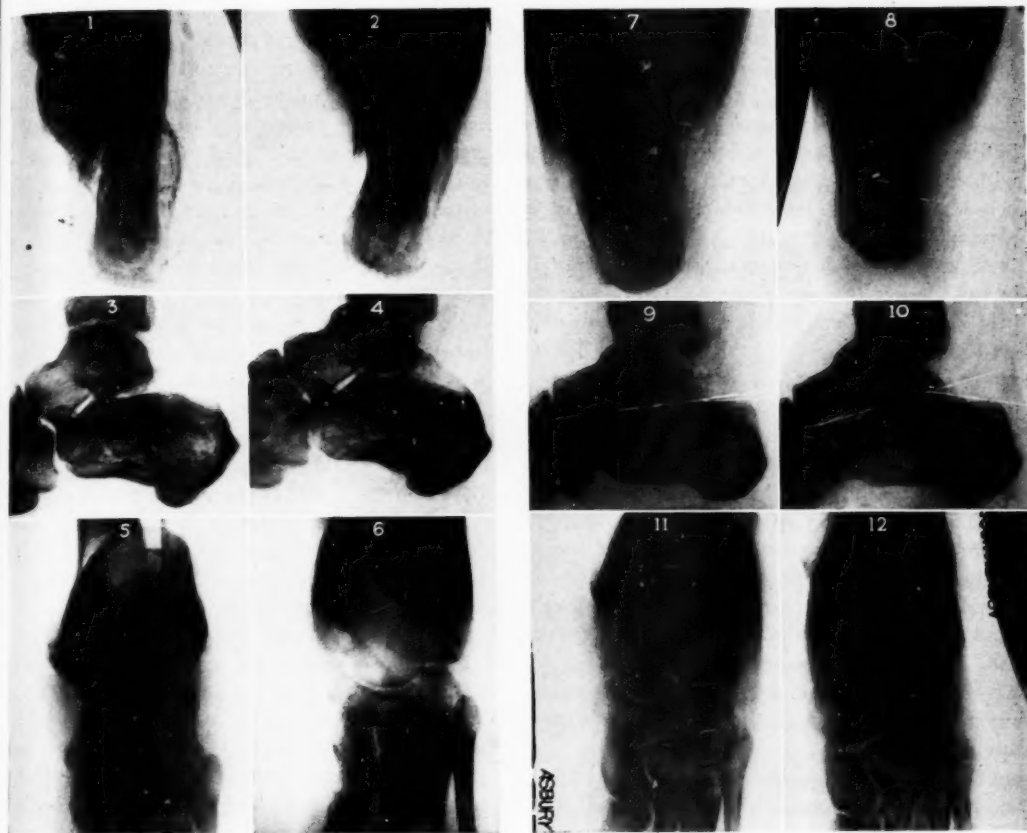
In a patient with a fracture of the os calcis, the usual lateral and plantar dorsal films are made, and, in addition, an antero-posterior view is taken to visualize the anterior portion of the os calcis. He is then put to bed with the foot elevated, and hot packs employed to aid in the reduction of the swelling and to lessen his pain. Reduction can usually be made in four or five days or a week. Occasionally ten days are necessary but never more than two weeks are allowed to elapse before reduction is attempted.

We anesthetize the patient with a general anesthetic to obtain complete relaxation of the muscles of the leg. The patient is placed on the affected side so that the foot can be brought to the edge of the table, with the heel extended over the edge.

The foot and ankle are now firmly held by the left hand, and with the right hand the heel is manipulated laterally, with repeated thrusts, until the fracture has been thoroughly disimpacted.

*Presented with motion picture and x-ray slides, before the annual meeting of the Minnesota State Medical Association, Saint Paul, Minnesota, May 5, 1937.

OS CALCIS FRACTURES—YOERG



Case 1.—P.S.L., aged fifty-nine, a grain elevator foreman, fell October 13, 1936, a distance of ten feet from a ladder, sustaining a fracture of his right os calcis. Reduction was made October 18 and the cast was removed November 20. The patient began to walk on his foot December 12. He returned to light work February 18, 1937, and to regular work March 15. There is a slight limitation of motion in the subastragalar joint.

Fig. 1. Plantar dorsal view shows extensive fracture with lateral displacement of the tuberosity.

Fig. 2. The fracture after reduction, lateral displacement corrected.

Fig. 3. Lateral view before reduction. The posterior joint surface of the os calcis is flattened and the carrying angle negative.

Fig. 4. Lateral view after reduction. The fracture is thoroughly disimpacted and the joint surface brought up. The carrying angle is restored to normal.

Fig. 5. Antero-posterior view before reduction shows a fracture into the anterior portion of the os calcis with moderate displacement.

Fig. 6. Antero-posterior view after reduction, displacement corrected.

Case 2.—J. F. Y., aged sixty, subpostoffice superintendent, on December 2, 1936, fell six feet, fracturing his left os calcis. Reduction was made December 8, 1936, and cast was removed January 6, 1937. The patient began to walk with crutches on February 8, 1937. He returned to work on May 2, five months after the injury. He has worked regularly, on his feet at least six hours a day. Motion is excellent and there is no pain in the foot, but the patient states that calf muscles tire toward the end of the day.

Fig. 7. View of tuberosity before reduction shows a comminuted fracture with broadening and shortening.

Fig. 8. Tuberosity after reduction. The broadening has been overcome and the bone lengthened.

Fig. 9. Lateral view before reduction shows a crushing of the posterior joint surface with the carrying angle zero.

Fig. 10. The posterior joint surface of the os calcis has been brought up, and the angle restored to normal.

Fig. 11. Antero-posterior view shows the front of the os calcis and astragalus, the scaphoid and the cuboid. The anterior portion of the os calcis has been fractured into the os calcis cuboid joint with marked displacement outward under the external malleolus.

Fig. 12. Antero-posterior view after reduction. The fracture of the anterior portion of the os calcis has been reduced and the external malleolus is now clear.

Any upward displacement of the os calcis is corrected by grasping the heel with one hand, the forward portion of the foot with the other hand, and then pulling the sole of the foot with a sudden thrust against a vertical bar. The broadened but now loosened bones are squeezed into place with an os calcis clamp. All of the procedures are done with the knee flexed and the foot in plantar flexion.

A well molded boot cast is applied, with foot in full plantar flexion. Constant traction on the heel is used while the cast is molded under the malleoli, over the back of the heel and under the arch of the foot.

After reduction and the application of the cast the patient is placed in bed, with the foot elevated. He is kept in bed for three or four days, or until his pain has disappeared. Many of these patients, in spite of the fact that the fracture is forcibly manipulated, have little or no pain following reduction. When pain has subsided and we feel that there is no more likelihood of pull from the calf muscles, the patient is allowed to be up and about, using his crutches. He is discharged from the hospital, but is not allowed weight-bearing on the injured foot.

Four weeks after reduction the patient returns and the cast removed. Radiographs will show union taking place and that it is sufficiently strong so that a cast is no longer necessary. The patient is then instructed to massage and actively and passively move the boot and ankle. Particularly is he instructed to evert and invert the foot to bring about a return of motion in the sub-

tragaral joint. He continues this massage and manipulation for the period of four weeks but is not allowed weight-bearing. He returns again at the end of four weeks, or two months after reduction. The radiographs then taken will show that union is firm. He is allowed to walk on the injured foot, using his crutches. In the ordinary type of fracture he does so with little or no pain, and, in a few days or a week, in most instances, will discard his crutches and walk without support.

We have now treated by this method thirty-one patients with os calcis fractures, three being bilateral. Of these, twenty-two have been restored to working capacity: five were returned to work in two and one-half months from the time of reduction, eight in three months, six in four months and three in five months.

We have one failure, in a railway mail-clerk, who fell from a ladder, a distance of twenty feet, and sustained a severe crushing fracture of the os calcis of both feet. This was one of the early cases, before we pulled the heel over the vertical bar. I thought at the time we had obtained a good reduction, but I see now that we did not completely reduce the fractures. His right heel is practically well as far as pain is concerned; his left heel still causes him trouble. He has not returned to work but has been working in his yard four or five hours a day, with some pain but not enough to keep him from working.

The accompanying illustrations of two selected cases show the fracture before and after the reposition of the bones by this method.

PHYSICAL THERAPY IN RELATION TO INDUSTRIAL MEDICINE*

FRANK H. KRUSEN, M.D.

Rochester, Minnesota

PHYSICAL therapy, applied intelligently under direct medical supervision, may be of great value in hastening the rehabilitation of those injured in industry. Kessler has pointed out that the end-results of industrial accidents "should be appraised not on the basis of structural changes but on disturbed function." It

is in the restoration of function that the use of physical measures is most effective. Some idea of the extensiveness of industrial injuries may be obtained from the estimate of Newquist, who said there were 16,000 accidental occupational deaths during 1935. Of course, the number who were merely maimed or injured were many times this amount.

For the most part, it becomes the duty of the medical practitioner to restore injured work-

*From the Section on Physical Therapy, The Mayo Clinic, Rochester, Minnesota. Read before the annual meeting of the Minnesota State Medical Association, Saint Paul, Minnesota, May 5, 1937.

men to remunerative employment as soon as possible. Shinn has said of industrial medicine that: "Its purpose is to insure good health and prevent injuries, thereby promoting contentment, alleviating suffering and increasing the life span of man. It further deals with the rehabilitation of diseased and injured persons in an effort to insure them a livelihood." It cannot be stressed too strongly that there is great need for all physicians to be familiar with the best and simplest methods of treating the injured workman. As Sir John Simon has put it, "Measures, whether voluntary or compulsory, for the prevention of industrial disease and ill-health depend primarily on the knowledge, skill and coöperation of the medical profession." The objective to be attained in the treatment of all those injured in industry is the return of the involved worker to normal working status in the shortest possible time. This should be desired by the physician and the injured worker, as well as by the employer.

The chief sphere of usefulness of physical therapy in industrial injuries lies in the treatment of the large group of cases in which there has been trauma to bones, joints, muscles, nerves or skin. Hastening of restoration of articular function is one of the most important phases of this work. Another important contribution of physical therapy is in the rehabilitation of the badly maimed worker, who must be reëducated to make the best use of his limited physical capabilities. Frequently, a properly graduated routine, including surgical treatment, physical therapy, occupational therapy, the sheltered workshop, and a new type of remunerative occupation suited to the handicapped patient's limited ability, will make a happy, useful citizen and worker of a potentially permanent invalid.

Occupational therapy which plays an important part in this transition is a form of physical treatment, and properly administered under medical supervision it will aid greatly not only in restoring function but also in improving the patient's morale. Odencrantz has said: "Anything that can be done to help the handicapped build up his confidence, his morale and his ability, increases his opportunity for satisfactory adjustment."

Because of certain psychic factors which enter into the problem of the injured worker, it is essential that all phases of treatment, and partic-

ularly the details of physical therapy, be under direct supervision. No opportunity should be permitted for prolonging such treatment until it becomes a habit, and under proper medical supervision this will not occur. Physical measures should be used only when and as indicated and only when they are producing definite objective improvement. Likewise, during the application of these treatments there is an opportunity for the highly important personal contact between the physician and the patient. Eckelberry has said: "The injured workman may be just a file with a name and number in the insurance office, another case on the calendar at the hearing, and an interesting case to the doctor; but he is nevertheless a human being, influenced by his emotions, subject to hate, fear, doubt and gratitude, even as you and I. To obtain the best results in his management he should be treated as a human being."

Among the physical agents which may be applied with benefit in treating industrial injuries are heat, light, water, electricity, massage, exercise and occupational therapy. The employment of these physical measures, in their simplest form and under close supervision, frequently at the patient's home, is highly to be desired.

The physician should never write an order to some lay technician to give the patient "some physical therapy." This is just as ridiculous as if he were to write a prescription to a druggist to give the patient "some medicine," and the results are likely to be equally as unsatisfactory. The order which is frequently written for B. M. and E. (baking, massage and exercise) with no detailed instructions is likely to prove equally futile.

The Council on Physical Therapy of the American Medical Association has demonstrated that there are many physical agents which, when employed scientifically, are of great value therapeutically. Unfortunately, many physicians are little acquainted with the proper use of physical agents in treating disease because until very recently this subject was much neglected in the medical schools. At present, the intelligent employment of physical therapy in our hospitals and in private medical practice has done much to combat the charlatan who has attempted to worm his way into industrial medicine as well as other phases of medical practice.

* The essentials for proper treatment of indus-

trial injuries by means of physical therapy are: (1) devices for the production of the required physical agents (these should be as simply constructed as possible); (2) a physician skilled in the use of these devices and thoroughly familiar with the effects which they can produce; and (3) in many instances (when the physician does not wish to apply treatments himself) a trained technician who has skilled hands for massage and manipulation and who can also use various apparatus as ordered by the physician.

Light Therapy

Since the early part of the Seventeenth Century, when Isaac Newton discovered that a beam of sunlight could be split by means of a prism into the various primary colors, a series of subsequent discoveries have developed a huge electromagnetic spectrum with varying physical properties which physicians have learned to use in treating disease. Below the red end of Newton's rainbow were found invisible infra-red (heat) rays, and above the violet end were found invisible ultraviolet (chemical rays). Below the infra-red rays are hertzian waves, which physicians now utilize for short-wave diathermy. Above the ultraviolet rays lie the roentgen rays (physical rays whose therapeutic value is familiar to all physicians), and beyond these lie the gamma rays of radium (the therapeutic value of which is also well known).

Today, the injured workman may be instructed to buy a simple heat lamp which will produce either near or far infra-red rays for medical treatment. These infra-red lamps (heated by resistance coils) do not vary greatly from the ordinary household heater with the exception that the latter has a wider reflector which diffuses the heat through the room, while the therapeutic lamp has a more convex reflector which localizes the radiation of heat on the bodily surface. The so-called infra-red units (heated coils or plates) and luminous bulbs (carbon or tungsten filament lamps) may be used in the same convex reflector. The former produce less penetration of heat and more surface heat; the latter produce more hyperemia and slightly more penetration. Large lamps which have big reflectors may be used to treat extensive lesions. For use in the home, a simple home-made baker may be constructed by any tinsmith at a cost of two or three dollars. These various heat

lamps will be found extremely valuable in producing surface hyperemia to relieve the pain of sprains, contusions, fractures, and certain inflammatory lesions.

In indolent wounds and in certain types of ulcerations and lesions of the skin, the ultraviolet rays produced by a mercury quartz or by a carbon arc light may be found useful.

Time does not permit a complete consideration of all the indications for the use of light rays in industrial diseases; nevertheless, many uses are known.

Heat Therapy

One of the simplest and most effective methods of applying heat locally is by means of the paraffin bath. Extremities may be dipped in melted paraffin, a coating of which is left on the part for twenty to thirty minutes. A glove or boot of paraffin is formed, which may be stripped off with ease at the end of treatment. This leaves a marked hyperemia of the skin. The paraffin may be painted on a shoulder, arm or back and later removed, leaving a warm reddened skin which is ideally prepared for massage.

Hydrotherapy

One of the easiest ways of stimulating peripheral circulation is to apply the time-honored contrast baths. These are applied to the extremities, by using buckets or pans as containers for the hot and cold water. If a shoulder or some portion of the trunk is to be treated, an ordinary bath spray may be used to apply hot and cold water alternately to the affected region. This will produce effects comparable to those achieved by immersion contrast baths.

Whirlpool baths (baths of whirling, aerated water at a temperature of 110° F.) are excellent for the auxiliary treatment of fractures, preliminary to massage and therapeutic exercise. These baths may be constructed for a few dollars by any plumber (specifications may be obtained from the Secretary of the Council on Physical Therapy of the American Medical Association).

Recently, underwater exercises have been used not only for the treatment of poliomyelitis but also for the treatment of extensive trauma. The patient is placed in hot water in a specially constructed tub known as a Hubbard tank. In this

hot water the muscles usually relax, and massage is administered under water during the period of maximal heating. Exercises under the water are readily performed because of its buoyancy and it is possible to secure activity in all planes.

Electrotherapy

The use of short wave diathermy, although much exploited, nevertheless must be considered favorably in the treatment of many types of deep trauma to soft tissues. The effects are explained merely on the basis of heating of the tissues, but this heating has been proved to reach to deeper levels than can be obtained by any other means of application. In most instances, an induction coil, cuffs, or air-spaced electrodes should be applied to the area to be treated.

Massage and Corrective Exercise

Stevens in discussing the use of physical therapy in industrial injuries pointed out that by far the most valuable service which such therapy renders is in "the preservation and restoration of joint function." He believed that the technician skilled in massage and manipulation was the "sine qua non of the physical therapy set-up." In this I can heartily concur. I agree also with certain of his conclusions, namely, that "joint restriction can often be prevented by early motion which stimulates rather than hinders repair"; that "the use of apparatus has definite value but only as a preliminary to skillful manipulation at the hands of the physician or well-trained technician"; and that "active use of the part, preferably under the supervision of an occupational therapist, is a necessary supplement to other physical therapy procedures."

Occupational Therapy

Occupational therapy should be administered in conjunction with other physical measures. Devices such as the shoulder loom may be used to hasten the return of articular function in a most agreeable manner. Occupational therapy plays an important part in reeducating those who have been severely maimed in industrial accidents. Stroud has said: "The majority of the

handicapped who may be rehabilitated and placed in industry are those with cardiovascular, arthritic and orthopedic disabilities." He has recommended training in occupational therapy followed by work in sheltered workshops as a means of fitting patients for suitable industrial positions. Eckelberry has said, "One of the greatest aids in rehabilitation is the opportunity for the workman to resume work of a lighter character than his usual job and . . . gradually to approach the same work and activity he enjoyed prior to the accident."

Conclusions

1. The use of physical therapy may be of considerable value in the treatment of industrial injuries.
2. This type of therapy is particularly applicable to the hastening of restoration of function following trauma and to the rehabilitation of the severely handicapped patient.
3. The application of physical measures should be under close medical supervision, and specific instruction concerning treatment should always be given.
4. Many simple physical devices may be utilized in treating industrial injuries; these devices may frequently be constructed for home use.
5. Massage and manipulation must always be performed by skilled hands.
6. Occupational therapy in conjunction with other forms of physical therapy plays an important part in the rehabilitation and return to industry of the severely handicapped worker.

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CASE REPORT

HYSTERICAL DYSPHAGIA*

HERBERT W. SCHMIDT, M.D.

Rochester, Minnesota

THE most common conditions which cause dysphagia in the superior portion of the esophagus are:

1. Intrinsic lesions of esophagus:
 - a. Carcinoma
 - b. Benign stricture
 - c. Pharyngo-esophageal diverticulum with secondary esophageal stenosis
2. Neurologic lesions:
 - a. Bulbar palsy
 - b. Amyotrophic lateral sclerosis with bulbar involvement
 - c. Infantile paralysis with bulbar involvement
 - d. Myasthenia gravis
3. Extrinsic lesions:
 - a. Laryngeal lesions
 - (1) Inflammatory
 - (2) Neoplastic
 - b. Tumors of the neck:
 - (1) Goiter
 - (2) Other tumors
4. Foreign bodies
5. Functional conditions:
 - a. Functional dysphagia
 - b. Hysterical dysphagia

Hysterical dysphagia was so named by H. S. Plummer, in 1914, because he believed it was a functional disturbance, of a hysterical nature, which involved deglutition.

This syndrome is characterized by a difficulty in swallowing and is associated with a hypochromic anemia; it occurs among women and there is no definite evidence of organic obstruction in the esophagus. The patients describe a dysphagia which begins suddenly, and usually is as pronounced at the onset as at any time in its course. The patients have the greatest difficulty in swallowing solid foods; they say that solid foods will not go past the level of the cricopharyngeus muscle. This difficulty may become extreme. In a recent case that was reported, the patient said that she would strain the juice from strawberry sauce to get rid of the seeds and would dilute and then strain buttermilk to get rid of the curds before ingestion, because she was afraid they would lodge in the upper portion of the esophagus and strangle her. Swallowing of pills and capsules, no matter how small, causes a great deal of trouble. Most of the patients have false teeth, and fissures at the angles of their mouths. There frequently is a glossitis which is associated with atrophy of the lingual papillae, which

gives the tongue a red, glazed appearance which resembles the type seen in pernicious anemia. In about a third of the cases the spleen is palpable; most of the patients have an achlorhydria. It is felt that the changes in the mucous membrane and the splenomegaly are secondary to the rather severe prolonged dietary restrictions and resulting anemia.

These patients can be cured by passing an esophageal sound into the stomach over a previously swallowed silk thread, and subsequently given a good deal of reassurance. As Dr. Moersch has pointed out, this strengthens the theory that the condition is primarily of a functional nature, since the size of the sound passed is immaterial and the esophagus is not stretched.

Report of Case

The patient was a woman, forty-five years of age, who for about twenty-five years had had more or less difficulty in swallowing food. She said that a "hurting sensation" would develop in the region of the pyriform sinuses, on swallowing. She had deep fissures at the angles of her mouth and a sore tongue which had caused her much anxiety and concern. An anemia had been found ten years previously; the value for the hemoglobin had ranged from 46 to 53 per cent and the number of erythrocytes had varied from 3,800,000 to 4,360,000 per cubic millimeter of blood. An achlorhydria had been discovered, and the possibility of pernicious anemia and Banti's disease had been considered. She had been placed on a high vitamin, high caloric diet and dilute hydrochloric acid had been administered. This treatment had produced improvement in her general physical condition and blood findings.

In May, 1936, she was seen at the clinic and said that for one year she had had an increase in the difficulty in swallowing, which had become so severe that she had been unable to swallow aspirin tablets or even small pieces of meat because she had felt that the "opening in her esophagus was simply too small."

Examination disclosed a pale, white woman. She had false teeth, fissures at the angles of her mouth, and a red, smooth, beefy tongue. The value for the hemoglobin was 12.9 gm. per 100 c.c. of blood and there were 4,520,000 erythrocytes in each cubic millimeter of blood. Special blood smears showed nothing diagnostic. She had an absence of free hydrochloric acid in the gastric contents. The spleen was palpable. A rather large adenomatous goiter was present but there was no sign of hyperthyroidism. Her basal metabolic rate was found to be +3 per cent. It was felt that, in view of her age, the goiter should be removed. The possibility that the goiter might be a factor in the causation of her dysphagia also was considered. A thyroidectomy was performed and she made an uneventful convalescence. Her dysphagia, however, failed to improve. It was then recognized that she had a true hysterical dysphagia. A No. 41 French sound was passed into the stomach; no obstruction was encountered. After the immediate effect of the passage of the sound she was able to swallow all types of foods without difficulty. Iron and ammonium citrate was given by mouth and three months after the passage of the sound the patient did not have any dysphagia.

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*From the Section on Peroral Endoscopy, The Mayo Clinic, Rochester, Minnesota. Read before the annual meeting of the Southern Minnesota Medical Association, Winona, Minnesota, August 11, 1937.

Question Conference on Obstetrics and Gynecology

CHAIRMAN MUSSEY: It was suggested that a question conference or question panel be held in obstetrics and gynecology as a sort of trial flight this year. We have several men who are interested in obstetrics and gynecology or both, who have kindly consented to carry on this conference. The answers to these questions, will be limited to two or two and one-half minutes, if possible. We aim to get through a fair number of them in the time allotted to us.

The first question will be answered by Dr. Randall:

"Of what value is prepartum care?"

DR. L. M. RANDALL (Rochester): I think the answer to this question probably is obvious to all of you, but those of us who are practicing obstetrics and gynecology feel that too much emphasis cannot be placed upon the prenatal care of the obstetrical patient.

To me, it has always seemed that this type of preventive medicine, which it is, is essentially an invoice of the patient's physical, mental and nervous assets and liabilities.

It has been shown, of course, in a great number of patients who have had what we consider to be adequate prenatal care, that the incidence of complications of pregnancy, labor and the postpartum have been reduced by one-half. We all realize that, if a patient is seen early in pregnancy, the blood pressure is taken routinely, the urine examined and pelvis measured, that we are in a much better position to guide that individual through a pregnancy than we are in the patient that we see when she is already in labor and have not had an opportunity to check these things.

In considering the blood pressure readings, it has been found that those patients who develop toxemia show first an elevation of blood pressure.

Some criticism has been made that the examinations of these patients with toxemia or suspected toxemia are too complicated.

I think, on the whole, if one reviews the situation, it will be found that the tests that will detect the presence of this condition are relatively simple: blood pressure readings, examination of the urine, and checking the patient's weight, leaving out the more complicated laboratory procedures.

I think we all need to emphasize to the patient, and I suppose to ourselves, that the chief thing to consider with these people is to see them early and do the essential, simple, routine examinations that we believe form the part of adequate prenatal care.

CHAIRMAN MUSSEY: This question is for Dr. Litzenberg:

"Is radical treatment, that is, therapeutic abortion or cesarean section, often necessary in heart lesions during pregnancy?"

DR. J. C. LITZENBERG (Minneapolis): Therapeutic abortion and cesarean section in heart disease are almost never necessary. The attitude towards this subject has been very rapidly changing, ever since the internists have crystallized their ideas about the treatment of the heart.

The treatment of the heart in pregnancy is the treat-

ment of the heart, and not therapeutic abortion or cesarean section. At the University Hospital we rarely do a cesarean section for heart disease, and we almost never do early therapeutic abortions.

It can all be summed up very briefly: If every woman is examined when she comes in as to her heart condition, and then every woman with a damaged heart is treated as to the heart, a therapeutic abortion will almost never be necessary. As a matter of fact, the internists have greatly advanced in the treatment of the heart during the last decade or fifteen years.

With this modern heart treatment, if a woman does not improve under the best medical supervision, then a therapeutic abortion may be considered. Even if a woman comes in during later pregnancy and has not been properly treated before, she almost always responds to the modern treatment of the damaged heart, and cesarean section will almost never be necessary. The only operative procedure that is necessary in most of these cases is that the labor be shortened as much as possible after complete dilatation, of the cervix. Then forceps may be applied, but I have been surprised at the rapidity of the labors in these heart cases, and in most of them we don't even use forceps.

The whole question may be summed up in one sentence: The damaged heart in pregnancy should be handled by treatment of the heart and not by obstetrical interference, except to shorten labor.

CHAIRMAN MUSSEY: The next question is for Dr. Rothrock:

"What are the indications for forceps delivery?"

DR. J. L. ROTHROCK (Saint Paul): The indications for forceps delivery are several. Usually, having watched the progress of labor, if we come to a time when there is no further progress, then it becomes necessary to consider the possibility of the necessity of delivering the patient with instruments.

Before this is done, it is very desirable to have, in your prenatal care, thoroughly examined the patient and to have made an exhaustive examination to know whether it is possible to deliver her with instruments. Prolonged labor is often the result of inertia of the uterus. The patients become exhausted. To allow them to go longer, perhaps, would be to their detriment. It is necessary to watch these patients, particularly, and to observe the time when it becomes desirable to interfere.

In cases of prolonged labor, it is particularly desirable, also, to handle your patients with extreme care, to prevent the possibility of infection, to eliminate, as far as possible, unnecessary examinations, and to look forward to the possibility that the patient, even though you successfully deliver her, if she becomes infected, will be in danger.

Another indication is the watching of the fetal heart sound to know whether the infant, the unborn child, is in danger. Sometimes it becomes necessary to suddenly terminate a labor with instruments, because of distress of the infant in prolonged labor.

The question is one which requires the greatest judgment, inasmuch as a certain number of borderline cases require reliance upon the so-called test of labor. How long should we permit a woman to go before we think of interfering? That depends on the condition of the patient. I would say that it may be summed up in this procedure: to carefully watch the patient, and, after there has ceased to be any progress in labor for

a certain length of time, then to increase our vigilance, and, before the patient becomes exhausted, or before the fetal distress manifests itself, to prepare to interfere with the instruments.

CHAIRMAN MUSSEY: The next question is for Dr. Manley:

"If you were called to see a woman in shock in whom you suspected tubal pregnancy, how would you handle the situation?"

DR. J. R. MANLEY (Duluth): In handling tubal pregnancies, there has been, in the past, two classes of men, one who believed in waiting, and one who believed in operating. My practice has been to take care of these cases as soon as the diagnosis is made.

With one or two exceptions, the first thing to do in a case of ruptured tubal pregnancy is to transport the patient to the hospital, if possible, and give a little morphin. While waiting for the operating room to get ready, a blood transfusion or glucose intravenously should be given.

I believe the shock in tubal pregnancy is due to hemorrhage, and the logical thing to do is to stop the hemorrhage as soon as possible. A blood transfusion should always be available and may be given before, during, or after the operation. The first object during the operation is to deliver the ruptured tube and stop the bleeding. Then you may remove organized clots and complete the operation. It is not necessary or advisable to spend time removing all the blood.

CHAIRMAN MUSSEY: Dr. Hartley will answer this question:

"What are the indications for version?"

DR. E. C. HARTLEY (Saint Paul): Version is one of the oldest obstetrical operations. There are two kinds, depending on which end of the fetus you intend to cause to engage. If the head is brought down, then it becomes cephalic version. If you want to make the breech present, it becomes a podalic version.

Cephalic version is attempted when the breech presents. This may be done by external manipulation and, if it can be done, it is very desirable. If it is too difficult, it probably isn't worth doing. Often if done, unless the head can be made to engage at once, it will not stay in place.

The commonest type is podalic version. This means inserting the hand into the uterus, grasping one or two feet and bringing them down to the outlet. By means of this maneuver it is possible to convert such presentations as face, brow or shoulder into one relatively easy to deliver. For other reasons, such as hemorrhage, it may be desirable to get something down in the cervix so that delivery may be done almost at the discretion of the obstetrician.

There is a type of uterine inertia which several men have described, in which long labor finally results in the complete dilation of the cervix and yet the patient doesn't deliver. If this condition can be accurately determined in advance, and we know for certain that there is no bony obstruction, a podalic version may often be done with surprising ease.

CHAIRMAN MUSSEY: Dr. Rothrock:

"What are the outstanding indications for cesarean section?"

DR. J. L. ROTHROCK (Saint Paul): The outstanding

indication for cesarean section is a disproportion between the size of the baby and the pelvis. In other words, the most important indication is found in those patients with contraction of the pelvis. It used to be said that there were absolute indications, and indications which were under the title of emergencies. The absolute indication was a pelvis where the inlet was 7 centimeters or less. Today we recognize the fact that with inlet contraction there are a number of cases where the inlet is much more than 7 centimeters, yet the size of the head of the infant will not pass.

Then, too, we have to take into consideration contractions at the pelvic outlet, which are quite frequent. There have been added many indications for cesarean section. For example, the question of central placenta prævia in a primipara with a rigid cervix, in my opinion, becomes a perfectly justifiable indication for cesarean section. There are certain indications which arise, where it is desirable to deliver the patient, as, for example, in cases of toxemia. They are very few, however.

The premature separation of the placenta, especially the more severe form, also forms an indication where hemorrhage is going on and where, if the patient's condition is at all suitable for an operation, then sometimes the only method of rescuing that patient is to deliver as quickly as possible, and that can be done in case the patient is not in labor, by a cesarean section. These form some of the indications.

It is true that in recent years the application of cesarean section has been much extended, and some of the indications which have been alleged, have, in my opinion, brought about a situation in which far too many cesarean sections are made where the patient might be more safely delivered by other methods.

CHAIRMAN MUSSEY: Dr. McKaig is next:

"How would you manage sepsis in a farm home delivery?"

DR. C. B. MCKAIG (Pine Island): My practice being mostly among the farmers makes quite a lot of difference in the handling of sepsis. The first thing I see to is that my instruments and gloves are sterilized at home in a pan contained in my grip with a good tight lid on it. The main reason for the lid is to keep the dust and flies out after you arrive at the patient's home.

The patient is scrubbed up with a combination of liquid soap and 1:2500 metaphen, half and half, which gives you a good lather. She is washed up, the legs and all sterilized but not shaved. Then after drying, the legs and vulva and parts are thoroughly sprayed with tincture of metaphen by means of an atomizer. Incidentally, at that time I strap a flashlight on the leg with adhesive plaster, so as to give me plenty of light. Usually the light isn't very much good in farm homes.

One of the main things is to impress the people that they should leave everything alone, not to handle any of the instruments, which they are very apt to do, picking one up and asking the doctor, "What is this for?" Then you have to do your sterilizing all over again.

One of the chief managements for sepsis is to do as little vaginal examination as possible. Do most all of your examination by way of rectum, keeping track of progress in that way. I carry impenetrable pads and waterproof dressings for the bed.

CHAIRMAN MUSSEY: After the program was printed, Dr. Wahlberg kindly consented to take part in this conference. The question has come in:

"What is the most acceptable treatment for pre-eclamptic toxemia and eclampsia?"

Dr. E. W. WAHLBERG (Morgan): The treatment of preeclamptic toxemia, as you know, may be divided into prophylactic and active treatment, both of preeclamptic toxemia and the eclampsia.

Dr. Randall mentioned some of the indications in prenatal care. The outstanding features of the value of prenatal care in the prophylaxis of preeclamptic toxemia are the routine examination of the blood pressure, urinalysis and the recording of weight, and the recording of these so that one may detect early the development of preeclamptic toxemia and take proper steps.

How should preeclamptic toxemia be treated? In the first place, it must be considered as a medical condition to be treated by medical measures primarily. Any other measures, such as the interruption of pregnancy, are secondary to the medical measures.

In the consideration of preeclamptic toxemia, it may be considered as a disease that progresses from mild to severe forms. In other words, when we have a patient who develops a slight hypertension, with edema, and some albuminuria, even if this is very mild or slight, treatment begun then may prevent the development of a higher blood pressure and more severe symptoms.

The treatment at that time consists of bed rest, laxatives and, what is very important, sedatives, the use, if the condition progresses, of intravenous glucose and magnesium sulphate solution.

I must hurry, so I will go into the more severe form that may culminate in eclampsia: You may not have seen the patient before. Particularly in those cases where the patient is possibly far from the hospital, or where the patient has to be taken into the hospital, the very most important thing is the use of morphin sulphate in a dose of $\frac{1}{4}$ to $\frac{1}{2}$ grain and used every half hour or every hour until the patient's respirations get down to 10 or 12. This will control a great many.

In the hospital, the use of intravenous glucose, the use of magnesium sulphate solutions intravenously, and other sedative measures, are carried on before any attempt is made to interrupt the pregnancy. That is the important thing. If interruption of pregnancy is determined upon, it should be done, if possible, after the patient has recovered from the acute condition, which is shown by diuresis, regaining consciousness and sweating. If cesarean section is done, it should be done on objective indications, after medical measures have been tried.

CHAIRMAN MUSSEY: Dr. Manley:

"What are the symptoms in early carcinoma of the cervix?"

Dr. J. R. MANLEY (Duluth): The trouble with carcinoma of the cervix is that the symptoms do not become evident early enough. The public are pretty well trained now to see the doctor if they have postmenopausal bleeding, or if they have bleeding to any extent between their menstrual periods.

My experience is that when people come to me with that story and I look at the cervix and a carcinoma is found it is not early any more; it is almost too late to do anything. I think we have to train our patients to notice other symptoms besides bleeding. If women were trained to notice any alteration in the leukorrheal discharge which they may have had for years, just a little change in its character, a little burning, and would then come for examination, we might be able to do more.

I believe we should examine all women who come to our office, no matter what they come for. If they come for stomach ache or neuralgia, oftentimes a well directed question or two will make them willing to submit to a pelvic examination. Many women will welcome that suggestion. They do not care to ask for it because they think their symptoms are insignificant. But we can accomplish a great deal towards diagnosing early carcinoma of the cervix by educating people.

After they come, it is up to the doctor, then, to decide. The gross cases we see often enough, and it is too late, but it is the small, early ones that we do not get a chance to examine, and therefore we haven't much experience in diagnosing them. The Schiller test is one of the late methods. In my experience, it has not been of a great deal of value because it is positive in erosions and various other conditions. The Schiller test is of value only in very early lesions before there has been any breaking down of the surface epithelium, and even then a positive reaction may not always mean a carcinoma. But if our attention is called to the possibility of making an early diagnosis and we make a study of the Schiller test, we may be able to spot a few of these real early carcinomas which are evidenced by just a little, pale, thickened area in the cervix, before the mucous membrane has been eroded. That is the chance that we have to cut down the deaths from carcinoma of the cervix.

CHAIRMAN MUSSEY: We have the following hypothetical question:

"If I had a patient with occiput in the posterior position on the first labor and had only about six fingers of dilatation of the cervix after thirty hours of labor, how should I handle the situation?"

Dr. J. L. ROTHROCK (Saint Paul): One of the most difficult propositions the obstetrician has to deal with is the occipitoposterior position, that is the occiput, which normally rotates anteriorly, sometimes rotates posteriorly, owing to the position of the child or to some fault in the mechanism of the labor.

The question then is what to do for this case, if it is observed early. In the first place, the first stage of labor is going to be quite normal because before any rotation possibly could take place the occiput must reach the floor of the pelvis. Almost all of these cases, if permitted to go on under careful supervision, will reach a point when the cervix is dilated.

The question of interference does not arise until the cervix is fully dilated and the head gets to the floor of the pelvis. Then the proper procedure is to conserve that patient's strength, to give her morphin to relieve the pains, and to watch her carefully, and, when the cervix is dilated, then comes the time for assistance.

It is possible sometimes in these cases, by introducing the blade of the forceps after the head has descended to the floor of the pelvis, to cause an interior rotation. In some cases the head becomes impacted, and then it is necessary to deliver with the occiput posterior.

These cases are disastrous in view of the fact that they are apt to cause deep lacerations, and, for this reason, if for no other, the patient should be permitted to go on, as far as she can with safety to the mother and the child.

I do not believe that it is necessary in these cases, as has been recommended, to resort to more radical forms of treatment, as, for example, that some of these cases should be delivered by cesarean section. I do not believe that.

OBSTETRICS AND GYNECOLOGY

CHAIRMAN MUSSEY: Dr. Randall:

"What governs the premenstrual phase of the menstrual cycle, and what happens if this is insufficient?"

DR. L. M. RANDALL (Rochester): The hormone of the corpus luteum, now known as progesterin, governs the premenstrual phase of the menstrual cycle. This hormone is secreted by the corpus luteum and produces the secretory or premenstrual phase of the endometrium. It likewise not only governs the premenstrual phase of the menstrual cycle but governs the integrity of the pregnancy in the early months, before the placenta is capable of performing its own function. A lack of the corpus luteum hormone will produce sterility, a typical menstrual bleeding, and abortion.

CHAIRMAN MUSSEY: Dr. Hartley, the question has come in:

"Can you tell me something about the prenatal care, or, rather, the refresher courses in obstetrics and pediatrics that are contemplated for the state?"

DR. E. C. HARTLEY (Saint Paul): The refresher courses which have been started in Minnesota by the State Department of Health, working with the State Medical Association and the Extension Division of the State University, have been begun, on the one hand, because the physicians in the country as a whole have favored such a development, and, in the second place, because funds are now available for a purpose of this kind. These funds are made available through the Children's Bureau under the Social Security Act. Courses of this kind are being given at the present time in a number of states throughout the country.

In Minnesota we started in during the winter, after preliminary arrangements with the officers of the State Association. The general manner of presentation is as follows: We have decided that a series of six lectures, covering the most interesting or important phases of obstetrics and pediatrics, would be offered. Six obstetricians and six pediatricians were selected. These twelve men together gave the first series at the University this winter. They were given there with the idea that this would work out as sort of a demonstration as to the value of the work not only to the physicians but also as a demonstration of the technic to those who were giving it.

Having completed this series with a fair amount of success, it was decided that, in giving this series throughout the state, six more obstetricians and six more pediatricians would be added, making twelve in all. These six lectures will be repeated in six different centers throughout the state, beginning on the twenty-sixth of May and ending with the end of June. The centers chosen are, Worthington, Mankato, Fergus Falls, St. Cloud, Brainerd and Grand Rapids.

It is hoped that the course will be repeated next year.

CHAIRMAN MUSSEY: Dr. Litzenberg:

"What type of pelvic contraction is most common in Minnesota?"

DR. J. C. LITZENBERG (Minneapolis): Pelvic contractions are dependent upon early, bad nutrition. Minnesota being a rural state and a "Scandinavian province," the children of our Minnesota women, when they have grown up, haven't had to go through a childhood of poor nutrition. For that reason, we have a low percentage of rachitic pelvis and general contractions of the inlet of the pelvis; we have enough, but

not as many as they do in parts of the country where they have Southern European immigrants.

In this state the contracted outlet is the most common contraction and I wish to pay particular attention to that. We are too apt to observe in our measurements only the contractions of the inlet. It is very easily detected, not only by special measuring devices but by measuring the width of the outlet by the simple device of the doubled fist. You may see that I have gained a little in weight in the last thirty-five years but that fist measurement of 8½ centimeters has never changed, because it is a bony measurement.

Every patient that I see has that outlet measurement taken with that fist. If the fist goes in between the tuberosities of the ischium with ease, I know that woman hasn't a contracted outlet. If it is tight or impossible to shove the fist in between the tuberosities of the ischium, at the level of the anterior border of the anus, I know I must give particular attention to instrumental and more careful measurements of the outlet.

There has been evolved by experience a rule, "the rule of fifteen," which is very easy to remember. If the measurements between the tuberosities of the ischium is 8 centimeters, the chances are very great that that is a normal outlet, but if it is less than 8 centimeters, then it is necessary to take the posterior sagittal measurement, which is that measurement from the tip of the sacrum (not the tip of the coccyx) to the line which runs between the tuberosities of the ischium, at the level of the anterior border of the anus.

So, if the measurement made from the tip of the sacrum to this line, added to the transverse measurement, equals 15 cm., then that outlet is capable of permitting a normal child to be born.

As to the treatment, that is a very long story. The Sims position or the exaggerated lithotomy posture may increase the outlet sufficiently to permit spontaneous delivery. If the contraction is marked, cesarean section, of course, had better be performed before a trial of labor has proven delivery impossible. When the head has reached the pelvic floor it is too late for a cesarean operation.

CHAIRMAN MUSSEY: Dr. Wahlberg, may I ask you this:

"How do you manage to get the woman in the smaller town, or in the country, to come to you for prepartum care?"

DR. E. W. WAHLBERG (Morgan): The newspapers and magazines are stressing the importance of prenatal care constantly, and most of the younger women today realize the importance of it. I think the chief drawback in country practice in getting people in to see us, is the fact that so oftentimes an extra charge is made for these individual calls.

I have gotten around that by increasing my basic charge for my confinement, and then it is up to the individual woman to either take it or leave it. Usually they will take it because they feel they are losing money if they do not come in for these visits and examinations. I think you can give just as good prenatal care in the country as you can in the city.

I usually average about six visits per patient, before delivery. The first visit includes a complete physical examination, including measurement, blood pressure, hemoglobin, and also blood Wassermanns on my new patients. In later visits I simply take the blood pressure, weight and urinalysis, except the sixth and eighth months, when I also do an external abdominal examination to determine the position of the fetus.

I don't think anyone has any difficulty in getting

OBSTETRICS AND GYNECOLOGY

their patients in. If you offer them something extra for their money the patients by word of mouth will soon spread the gospel around, and the ladies will flock to your door.

CHAIRMAN MUSSEY: Dr. Hartley:

"Puerperal sepsis is said to be the commonest cause of maternal mortality. What can be done about this?"

DR. E. C. HARTLEY (St. Paul): During the ten-year period ending in 1932 for the United States as a whole, about 37 per cent of all the maternal deaths were caused by sepsis. During 1936 in Minnesota, of the 198 maternal deaths, 35 per cent were caused by sepsis. Apparently the deaths from sepsis both in Minnesota and in the country as a whole run pretty close to slightly over one-third of all maternal deaths.

These are fairly evenly divided between deaths due to infected abortions and to puerperal sepsis. Regarding the deaths from abortions, probably the bulk of these are due to criminal abortions, and they are out of our hands except as to methods of treating them.

The spontaneous abortions rarely end in death provided they are not neglected. Puerperal sepsis is often thought of as being something that might well be laid at the door of the medical profession; there are, however, reservations to any such a viewpoint. There is, nevertheless, much agitation and much organized effort at the reduction of maternal mortality, particularly that due to sepsis. How can such deaths be avoided? In general it may be said that these deaths may be avoided by avoiding infecting the patient or traumatizing her unnecessarily.

This can be done by having the patient go into labor with the attending physician knowing as much about her as possible. In other words, don't try to find out the size of the pelvis after the patient is in labor. Don't make numerous pelvic manipulations when the patient is in labor. Remember that in prolonged labor rest and nourishment are of vital importance to the patient.

CHAIRMAN MUSSEY: Dr. Manley:

"If the pregnant woman has a tumor of the uterus, does this tumor often seriously complicate labor?"

DR. J. R. MANLEY (Duluth): This question could almost be answered categorically, "No." The only tumors you might be afraid of would be the ones down by the cervix. As the cervix dilates, the cervix pulls up around the head, rather than the head going through the cervix. Nine times out of ten it will pull the tumor up beyond the head, so there will be no obstruction to the delivery of the head. Like everything else, there may be exceptions to this.

It is quite possible that a fibroid, perhaps on a pedicle, might get down below the head and obstruct delivery. Small fibroids in the body of the uterus may interfere with contraction pains. They may cause postpartum hemorrhage, but as a rule they do not cause any trouble with the actual delivery. They may become necrotic after delivery and produce trouble in that way.

I had a recent case of that sort in which a large fibroid was let alone during pregnancy. During the puerperium, the patient had fever and swelling of the fibroid and tenderness, but it finally subsided. Later the fibroid began to grow again and was removed, and there was definite evidence of necrosis in the fibroid. But as far as actual difficulty in delivering the baby, it does not very often happen.

CHAIRMAN MUSSEY: Dr. McKaig:

"What would you do for pain relief in a long, tedious labor in a private home?"

DR. C. B. MCKAIG (Pine Island): Long, tedious labors are handled in the home by first giving some sedative. I usually use chloral, about 10 grains, let the patient alone for a couple of hours, then use nembutal. Later on I resort to the Reynolds chloroform inhaler, which the patient can take herself, and she gets a great deal of relief, without anyone in attendance watching that particular case.

CHAIRMAN MUSSEY: Dr. Randall:

"To what extent is it safe to use analgesia during labor?"

DR. L. M. RANDALL (Rochester): The lay press and the medical press has been full of articles on pain relief, in the last few years. The pendulum, I think, has definitely swung from the idea that a woman in labor was not to be given any relief from pain, to the opposite extreme, which is perhaps worse, of giving the individual at the onset of labor a sufficient amount of sedative to produce complete amnesia and lack of cooperation.

This condition definitely raises the incidence of obstetrical operations and I think in the long run will increase the maternal and infant mortality. Far be it from me to say the patient is to be denied pain relief. But in between these two extremes is the safe zone in which we can give the patient reasonable relief from pain, retain her cooperation in the second stage and reduce considerably the risk of this analgesia to the mother and to the baby.

It has been said, of course, that the ideal obstetrical analgesic should be perfectly safe for the mother and for the baby. That analgesic has not yet been discovered, so far as I know.

CHAIRMAN MUSSEY: Dr. McKaig:

"I would like to know of a satisfactory method of episiotomy in the home."

DR. C. B. MCKAIG (Pine Island): Out on the farm, trying to do your work without assistants or without anesthetists, you are up against it. My method of episiotomy in that case is to put in through-and-through stitches previously, before I do any cutting. I put in a row of about four or five stitches with No. 3 forty-day chromic catgut. They go right through the mucosa, into the vagina and back out again, making a row. Then the loops inside are caught with a pair of forceps, drawn out and pulled to one side. The incision is made right in between the stitches.

After delivering the placenta, it is easy enough to pull up and tie the stitches. I have found it very satisfactory in a series of thirty-seven cases.

CHAIRMAN MUSSEY: Dr. Litzenberg:

"What is the difference, if any, between the treatment of carcinoma of the cervix and carcinoma of the body of the uterus?"

DR. J. C. LITZENBERG (Minneapolis): There is a very general consensus of opinion regarding the proper treatment of carcinoma of the cervix, and that is that it is better treated by irradiation than by operation. This irradiation does not mean treatment by radium

but it means treatment by radium and deep x-ray therapy.

Very briefly, the rules of the Cancer Institute for the treatment of cancer of the cervix are these: We follow the Schmitz classification of clinical grouping, 1, 2, 3 and 4. No. 1 is a very early carcinoma of the cervix; No. 2 is an early carcinoma of the cervix, but still limited to the cervix, as far as clinical findings will reveal; and in No. 3 there is evident extension beyond the cervix into the parametrium, and No. 4 is far advanced cancer of the cervix.

In these days there is an exact measure of the amount of irradiation that may be administered to a given point, in this case the cervix. We may give a certain number of milligram-hours or millicurie-hours, with radium, and then the roentgenologist knows how much irradiation by x-ray he can give to that cervix. It is a formula which involves the measurement of the patient, the distance of the cervix from the tube, and so forth, but we may sum it up by saying that we determine in each case how much irradiation this patient must have.

Inasmuch as radium will apply the irradiation to the cervix in a better manner than the x-ray, in Group 1 we give as much irradiation as possible, 3,600 or 4,000, even more, milligram-hours. Then the roentgenologist has the amount of irradiation that we have given by radium and figures out how much more he can give and not go beyond the total amount that the normal tissues will stand.

In Group 2 we give about the same treatment.

In Group 3, when the cancer has extended into the parametrium, the surrounding tissues of the cervix, it is manifestly beyond the treatment of radium. Radium inserted into the cervix has a therapeutic limit of 3 centimeters, a little over an inch in each direction. Therefore, if we give all of the radium that we can possibly give, we have only reached, therapeutically, a distance of 3 centimeters surrounding the capsule or needle of radium. Therefore, that leaves the extension into the parametrium untreated. This must be reached by deep x-ray therapy.

In these modern days, the Coutard method of giving more x-ray treatments, a larger number with little bit smaller doses, has been a very great advance in the treatment of cancer of the cervix.

The mortality of cancer of the cervix in the better equipped clinics has been improving gradually. This later Coutard multiple, although shorter, individual

treatments by the x-ray has added a very great deal to the efficacy of the treatment.

The general opinion, also, is that in cancer of the body of the uterus there should be the operative method of total hysterectomy. In cancer of the body of the uterus, operation is better than irradiation.

However, the older method of making a diagnosis, say, by a frozen section, a diagnostic curettage, and then a hysterectomy at once, has fallen into disfavor because there is a large number of patients who will die of peritonitis when it is done that way. The consensus of opinion now is that, at the time of the diagnostic curettage, if a frozen section shows that there is cancer, then radium is introduced into the uterus for 2,000-3,000 millicurie-hours, and then that will stop or retard the growth of the cancer but, of course, will not cure it. Then wait six weeks and do a hysterectomy.

CHAIRMAN MUSSEY: Dr. Wahlberg:

"In the ordinary home deliveries in town or on the farm, how would you keep the patient quiet long enough to insure proper involution of the uterus?"

DR. E. W. WAHLBERG (Morgan): Postpartum care and rest, again, involve education of the patient. The average patient is willing to coöperate if she knows why she is asked to coöperate, and usually during that quiet hour after the delivery has been performed and you are waiting for possible hemorrhage, I take the father and the attendant aside and tell them the reasons for rest, why we want involution and how it aids in allowing proper healing in episiotomy wounds, and also how it prevents cystoceles, rectoceles, prolapse and other complications.

I leave a printed list of instructions as regards the care of the child and also the care of the mother. This specifically instructs her to lie in bed until the eighth day, let her sit up on the ninth, and let her be up on the tenth. The third day postpartum, I go back for a return call. Again I check up to see whether the instructions are being followed. Then I go through the same explanation with the mother and make her understand the necessity for rest. I haven't had any trouble, provided I explained thoroughly the importance of following directions.

The Apple in the Management of Diarrhea in Children

The Council on Foods reports that the use of fresh apples in the dietary treatment of diarrhea in infants and small children has been much publicized within recent years. Latterly, preparations of dried and powdered apple have been similarly acclaimed. The Council on Foods has considered the available clinical reports. These reports cover practically every kind of diarrhea that is encountered in pediatric practice. The Council concludes that the evidence which is now available indicates that the apple is useful as a thera-

peutic agent in the dietary management of diarrhea. The mechanism responsible for the reported success of this diet is not clear. Apple powder when suitably prepared is considered a wholesome food and offers a convenient preparation for use in the management of diarrhea of infancy and childhood. It should be emphasized, however, that the use of the fresh or dried apple does not obviate the necessity for other measures, including parenteral administration of fluids when indicated, the careful selection of a suitable transition diet, and competent pediatric supervision. (J.A.M.A., Nov. 13, 1937, p. 1636.)

HISTORY OF MEDICINE IN MINNESOTA

AN INTRODUCTION TO THE HISTORY OF MEDICINE IN MINNESOTA

By JOHN M. ARMSTRONG

Chairman Historical Committee
Minnesota State Medical Association

A DECADE ago a committee to collect data for a "History of Medicine in Minnesota" was appointed by our State Association. This committee has been active since its establishment and considerable data have been gathered, part of which is in a form suitable for publication. Since various members of the committee have submitted material in a finished form, of necessity there is considerable overlapping, and since it has been difficult to separate subjects which have both a general and local interest and assign them to the proper place, some duplication will occur during the narration.

Since this forms an introduction to future articles which will appear in MINNESOTA MEDICINE, a brief outline of medical history in Minnesota is here presented; later contributions will be more specific as to subject matter.

The history of Minnesota may be roughly divided into five overlapping divisions: exploration, the fur trade, military occupation, the missionary and permanent settlement. Similarly, the medical history may be so divided.

The French explorers and traders came first. Many of them were educated men, among them priests who no doubt were familiar with the medical practice of the age, but we do not find among them men with the title "doctor."

British occupation and the advent of the Northwest Company, a fur trading corporation with headquarters at Montreal, came next. Physicians were employed by this company as part of their organization. They were officially classed as clerks but received additional remuneration for their medical services. These men were stationed at times within the boundaries of our present Minnesota. With the withdrawal of the Northwest Company from American territory in 1816, the American Fur Company took over their posts and form of organization and employed physicians when available.

Military occupation by the United States government took place in 1819 when Fort St. Anthony, now Fort Snelling, was established. With the troops came our first American physician. Since that time one or more medical officers have been stationed there, with the exception of the years 1857-60 when the fort was temporarily abandoned. During the periods when Forts Ridgley and Ripley were occupied, army medical men were also stationed there. Some of these army physicians later attained some eminence both in their profession and in other lines of endeavor.

During the period of military occupancy came the first American missionaries, in 1835. All, no doubt, ministered to the physical as well as to the spiritual needs of the Indian, although but few were physicians.

Following the military occupation came various government expeditions. In those of Long, in 1820, Schoolcraft, in 1832, and David Dale Owen, 1848-50, the scientists accompanying them acted as, or were qualified as, physicians.

Some of them had previously practiced medicine and some later continued the practice of medicine.

The period of settlement began in 1838 with the beginning of lumbering on the St. Croix river, and civilian physicians followed the settlers.

One may say here that the French explorers and traders penetrated Minnesota by three routes along the north shore of Lake Superior, via the Brulé-St. Croix portage and the Green Bay-Wisconsin river route; the British entered by the north shore route; and United States exploration and settlement came in by way of the Mississippi river from the south, except that the troops which established Fort Snelling came by the Green Bay-Wisconsin river. It is logical, then, to find that our civilian physicians, as did our civilian population, followed the tributaries of the Mississippi. Stillwater, St. Paul, St. Anthony, Winona, Wabasha and Taylors Falls were our first towns. Then came Minneapolis, the towns along the Minnesota river, and those on the Mississippi above St. Anthony Falls.

Population grew rapidly during the sixth decade of the nineteenth century and numbers of physicians followed the emigrants; but since at first there was not sufficient practice to support them, many abandoned their profession and went into farming or trade, while others, after a brief sojourn, moved to other parts of the territory. With the opening of the territorial road north from Iowa, emigrants came into southern Minnesota overland, and the towns of Albert Lea, Rochester, Owatonna and Faribault came into being and attracted more medical men. Likewise southwestern Minnesota was peopled via the government road west to Fort Abercrombie. Northwestern Minnesota was not well settled till the railroads entered that region about 1870. Settlement in northeastern Minnesota lagged, as the country was not suitable for agriculture. Here the first settlers came by the lake route.

As soon as there were enough physicians they associated themselves for exchange of ideas and other mutual benefits and our first medical society was organized. This was a territorial organization formed in 1853 and local societies began to be formed soon afterward, though our present societies were not established till some years after the termination of the Civil War.

The earliest literature relating to medicine in our state is to be found in the reports of the government expeditions and reports of army surgeons, which are of considerable interest though few in number.

Medical journalism began in 1870 with the publication of the *Northwestern Medical and Surgical Journal*. Since that time nearly a dozen medical journals have been published, of which but two exist at the present time.

The teaching of medicine, other than the preceptorial system, began as early as 1870 with the establishment of preparatory medical schools in St. Paul and Winona.

Later other schools were incorporated and conferred degrees. At the present time our University and its affiliate, the Mayo Foundation, are the sole teaching institutions.

Our first private hospital opened its doors in 1854 and the first state hospital in 1866.

The State Board of Health was established in 1872, preceded only by those of Massachusetts and California.

The development and progress of legislation pertaining to the practice of medicine and the status of the physician in the community have undergone various changes since the organization of Minnesota as an entity.

HISTORY OF MEDICINE IN MINNESOTA

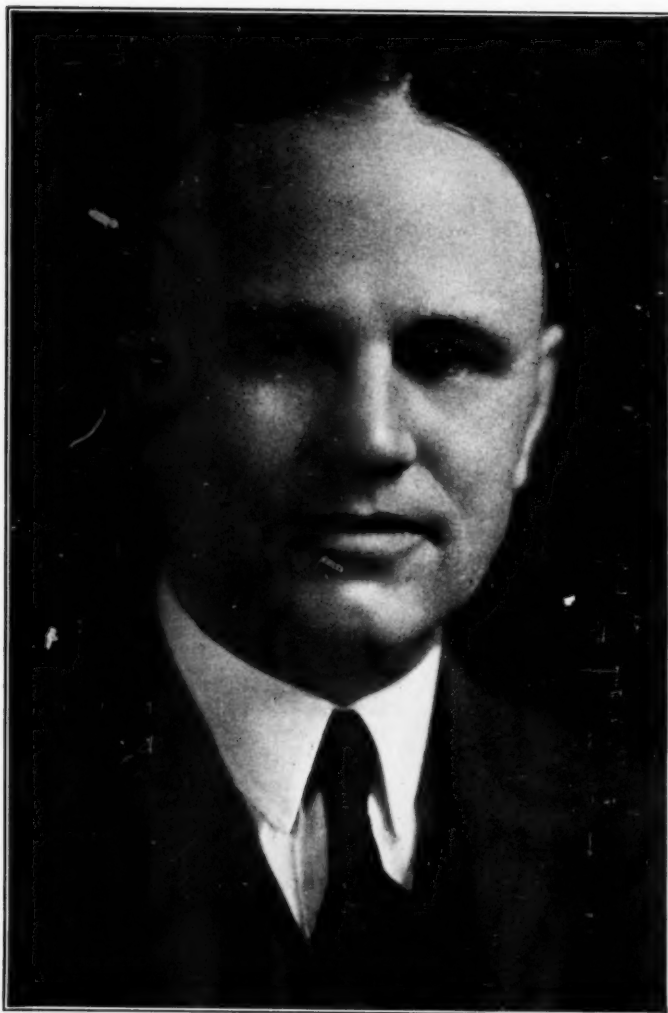
All these and other aspects of medicine will receive treatment at length.

Until 1854 our white population was largely composed of native Americans and French Canadians, but at that time emigrants of foreign birth began pouring in and physicians of foreign birth and training followed, giving a cosmopolitan character to our profession which has had a considerable influence on the development of medicine in our state.

In general, the preceding is an epitome, in outline, of the progress and development of medicine in Minnesota. Much interesting material relating to the services of medical men in the Army and Navy from the War of 1812 till the present has also been gathered. Biographical data, often of more than local interest, shedding considerable light on the progress of medicine and individual achievement have also been secured and will be presented separately or with the county narratives.

The committee feels that the difficulties encountered in recording the events of the last century have been much greater than any future investigator may have in recording those of the present. Hence we have confined our efforts largely to the past century.

It is the earnest desire of the committee that medical items of interest, trivial or not, be sent to the chairman. Particularly desired are old minutes of medical meetings, physicians' diaries, addresses, account books and letters. Material of this nature forms the basis of real insight into prevailing conditions as well as the thought and activities of the individual. Historians in general are turning more and more to data of this nature as source material. May we ask your coöperation in aiding us in our attempt to compile a "History of Medicine in Minnesota"?



J. M. HAYES, M.D.
President, Minnesota State Medical Association

President's Message

To the Members of the Minnesota State Medical Association:

I TAKE this opportunity of wishing you all a very Happy New Year. While I am duly grateful for the honor of being your president for the coming year, I am not unmindful of the fact that I am still only one small unit in a great organization. Whatever the administration does must be done at your bidding. You are all aware that in an organization of this magnitude, it is not the work of one individual or a small group of individuals, but the combined efforts of all members that bring about the desired results.

The problems of the medical profession have been much the same in the past as they are at present and will be in the future.

An era of depression merely magnifies the problems of those who are to be guardians of our principles, and greater efforts must be put forth to stem the tide of outside aggression. Such periods are always opportune for misguided philanthropic individuals and organizations. Improper care of the sick or the crippled child always furnished an arousing appeal to these individuals or organizations.

They all mean well, but unfortunately their information is frequently gained through improper channels. Only through the practicing physician can this information be properly obtained.

Our state and national medical organizations have the proper machinery and equipment necessary for obtaining information in regard to health problems and the care of the sick. Information obtained through other channels is frequently faulty and misleading. Such information put out to the public is bad for all concerned.

Adequate care of the sick should be the primary objective of every medical organization.

What is adequate care of the sick and how it should be administered are questions much discussed today. We know that there has never been a time when the sick were better taken care of than now. We also know that many new and fantastic schemes for improving medical care are not well founded. They are not products of the practical man.

Experience with various methods tried in other countries as well as some in our own, leads us to the conclusion that our old established Medical Guild is as good or better than any other system of medical care yet proposed.

All scientific improvement, all research or special skill of any nature may be encouraged and made use of under this system.

We do not oppose outside assistance where such assistance is necessary, but the care of the sick must always be kept in the hands of the medical profession.

J. M. HAYES, M.D.
President, Minnesota State
Medical Association

EDITORIAL

MINNESOTA MEDICINE

OFFICIAL JOURNAL OF THE MINNESOTA STATE MEDICAL ASSOCIATION

Published by the Association under the direction of its Editing and Publishing Committee

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BUSINESS MANAGER
J. R. BRUCE

Volume 21 JANUARY, 1938 Number 1

History of Medicine in Minnesota

BEGINNING with this issue of MINNESOTA MEDICINE, a number of pages will be devoted each month to the publication of the medical history of our state. The proposal of the Historical Committee of the Minnesota State Medical Association to publish in the journal the interesting material it has gathered on the medical activities in the state up to the year 1900, met with hearty approval. Doubtless the story of the early days will be much more widely read in piecemeal than in volume form. However, it is the present purpose of the committee eventually to publish in book form the pages appearing in MINNESOTA MEDICINE.

History, particularly medical history, has a special fascination for certain members of our

profession, but it is our hope that all our readers will enjoy the published history of medicine in our state as it appears in these pages each month.

The "Elixir" of Sulfanilimide Episode

PHYSICIANS have realized for some time that the existing Food and Drugs Act does not sufficiently protect the public. Proprietaries of unknown formula are allowed to be sold directly to the public, a procedure not allowed in certain foreign countries. Opposition, however, on the part of proprietary manufacturers has been so strong that remedial legislation has been obstructed. Doubtless a certain amount of prescribing of proprietaries of unknown composition takes place although this is a drop in the bucket compared to the counter sale of these remedies. Occasionally new drugs like dinitrophenol, cinchophen and amidopyrine are offered to the profession before their dangerous qualities are realized. Rarely, fortunately, is a distinctly poisonous drug offered for general distribution.

The tragedy of seventy-three known and twenty more presumptive deaths from the dispensing of Elixir of Sulfanilimide-Massengill, serves to call attention to the inadequacy of the present laws governing the sale of drugs. The so-called elixir was not an elixir in that it contained no alcohol. Further, the elixir contained an undeclared solvent—diethylene glycol—which proved to be the fatal poison. It seems, too, that the poisonous quality of diethylene glycol should have been known to the manufacturing chemist. And finally, although this was a new preparation, no preliminary tests as to its poisonous nature were made before it was sold to the drug trade.

We are told the only law violated was the use of the term "elixir" for a preparation which was not an elixir. Had the law required the revelation of the presence of the relatively unknown diethylene glycol as a solvent it is problematic how many of those physicians who prescribed the preparation would have

been deterred, so great is the faith of most physicians in the pharmaceutical houses. While these concerns are jealous of their reputations and as a rule are careful not to introduce drugs harmful in the recommended dosage, there is no law requiring such precaution.

Corrective legislation has been presented to Congress by Senator Copeland embodying the recommendations of the Secretary of Agriculture, who investigated the tragedy. In brief his recommendations were:

1. "License control of new drugs to insure that they will not be generally distributed until experimental and clinical tests have shown them to be safe for use." This is not to prevent the development of new drugs by experimentation in competent hands.
2. "Prohibition of drugs which are dangerous to health when administered in accordance with the manufacturers' direction for use." We presume this means the prohibition of direct sale to the public of such drugs.
3. "Requirement that drug labels bear appropriate directions for use and warning against probable misuse." Such warnings are certainly indicated in the case of dinitrophenol, cinchophen and amidopyrine, and their direct sale to the public should be prohibited.
4. "Prohibition of secret remedies by requiring that labels disclose fully the composition of drugs." Vigorous opposition to this proposal on the part of the proprietary manufacturers may be expected.

This proposed legislation will be lacking if it does not include the prohibition of direct sale to the public not only of distinctly dangerous drugs which should be limited to dispensation by prescription, but also of drugs which are habit-forming, including the barbiturates, the continued use of which in certain cases results in mental changes. The proposed changes, along with heavier penalties for infringement, will add protection to the public, but too much emphasis cannot be placed on the importance of each physician's prescribing only those remedies about which he is informed.

JANUARY, 1938

Health Progress

IT must be a matter of satisfaction to everyone associated with public health activities to know that the health of our citizens as reflected by mortality statistics has shown a marked improvement in recent years. A volume recently published* by the Metropolitan Life Insurance Company presents an analysis of the company's mortality experience for the twenty-five years from 1911 to 1935 inclusive, and the expert interpretation of its mortality experience over this period supplies a confirmation of impressions and some facts which may be new to many.

The mortality experience of this large company corresponds very closely to that of the registration area of the United States and serves as a check on government figures. During the twenty-five year period reviewed the life expectancy of the American citizen has been increased from 46.63 to 60.25 years, an increase of 30 per cent. This has resulted in spite of a World War, a most severe influenza epidemic and one of the worst economic depressions this country has experienced. Most of this increase in life expectancy has been due to the marked reduction in the diseases afflicting youth, childhood and particularly infancy.

The trend of the mortality curve for this twenty-five year period has been downward almost constantly except during the influenza epidemic, and, strange to say, has been particularly marked the last five years in spite of the economic depression. This does not suggest that the people are suffering from lack of medical care.

It may not be generally realized that the mortality in the first four years of life is comparatively high, showing a marked drop in the next four years of life until it is lowest during the ages of ten to fourteen. The curve then rises until at the age period of thirty-five to forty-four it is nearly double that of the first four years of life and, of course, is highest beyond the age of sixty-five. For all ages combined the mortality of males is 30 per cent higher than for females, and for the colored population is much greater than for the whites.

The reduction in incidence and mortality from

*Dublin, Louis I. and Lotka, Alfred J.: *Twenty-five Years of Health Progress: A Study of the Mortality Experience Among Industrial Policyholders of the Metropolitan Life Insurance Company, 1911 to 1935*. New York: Metropolitan Life Insurance Company, 1937.

the contagious diseases of childhood is particularly gratifying. Diphtheria heads the list with the most marked mortality reduction. Antitoxin and widespread immunization explains this but does not explain the marked reduction for measles, whooping cough and scarlet fever. Physicians may note that diphtheria rarely occurs in the first year of life in contrast to whooping cough and measles. The pre-school age, however, is an important period for immunization against diphtheria. The mortality for measles and its complications is greatest in the first and second years of life and the same applies to whooping cough, which in these two years of life accounts for nearly three times as many deaths as measles, scarlet fever and diphtheria combined.

Tuberculosis, though still the leading cause of death in early adult life exacts only a third the toll it did twenty-five years ago. Males die of the disease in greater numbers over the age of forty-five, while the age period of twenty to twenty-five is the worst for females. In recent years, the rate for girls ten to twenty years of age is twice that for boys, while at forty-five to fifty-five the rate for males is three and a half times that for females.

The necessary grouping of influenza and pneumonia makes deductions somewhat difficult. Some 450,000 to 600,000 deaths occurred in our population from these causes during the epidemic, and it is estimated some six to ten million throughout the world, more than from military operations throughout the World War.

We have known that lobar pneumonia is comparatively mild in Minnesota. In certain states, it is milder than in Minnesota, but is considerably more malignant in most of the Atlantic seaboard states, Missouri, Tennessee and Kentucky, and most severe in New Mexico, Arizona, and Nevada. There has been a decided decline in mortality from this disease during the past five years, for which pneumococcic serum may be partly responsible.

The increase in cancer deaths has been about 14.5 per cent. Several factors doubtless account for this. Better diagnosis and more autopsies revealing hidden cancer undoubtedly play a part. The shift of cancer mortality from seventh to second place during this period is due, however, for the most part to the reduction in other diseases.

The cardiovascular-renal group heads the list and accounts for about a third of all deaths; at the age of forty-five almost half. Infection as well as the aging process plays a part in the causation of these diseases. Even in this group there has been a slight fall in the death rate although this has been due to an improvement in youth where infections such as rheumatic fever and scarlet fever are more often causative factors. While valvular heart disease has fallen to half the mortality of fifteen years ago, this has been for the most part in those under twenty-five years of age. Heart muscle disease, however, has shown a marked increase at each age period and especially after the age of forty-five. The reporting of coronary diseases has changed considerably in recent years and the doubling of reported deaths from this cause in the past five years must be interpreted with caution although most students of the question believe there has been a definite increase in coronary disease, the most common cause of which is hypertension.

In spite of the discovery of insulin in 1922 the mortality from diabetes has increased, especially in women in whom it is now almost twice that of men. The benefits of insulin are seen particularly in diabetes in youth. The increase is attributed to more frequent diagnosis, the greater percentage of the population now in the older age groups and the increase in Jewish population from one million to four million in the past thirty years. Overweight and overindulgence in food and drink along with less manual work all play their part.

In spite of scientific advance in diagnosis and treatment, the figures for the puerperal state and appendicitis show no improvement during this period. An appreciable percentage of such deaths are preventable, and concentration on lay and professional education should produce results.

The story of accidental deaths in our country is appalling. In 1934, more than 100,000 persons were killed in accidents of one kind or another. In Canada the rate is 40 per cent less. We are surprised to learn that the trend during the twenty-five year period among policyholders has been downward and in the closing five years of the period was 25 per cent less than during the first five years. About a quarter of the fatal

In Memoriam

Warren Wilson

1863-1937

DR. Warren Wilson, long identified with civic and professional interests in Northfield, died September 4, 1937, from coronary thrombosis.

Dr. Wilson was born at Lyndoch, Ontario, April 24, 1863. He attended local grade schools and the high school at Simcoe and took his pre-medical course at Western University, London, Ontario. He received his medical degree at Northwestern University in 1889.

After practicing a year at Belding, Michigan, and several years at Duluth, Dr. Wilson bought the practice of Dr. S. J. Schmidt in Northfield. During the World War he headed the medical service of the S.A.T.C. at Carleton and St. Olaf with the rank of Lieutenant. In 1919 he was joined in practice by Dr. Joseph Moses and in 1924 by his son, Dr. Warren E. Wilson. In 1930, because of his health, he retired from active practice but was available for consultation.

In 1895 Dr. Wilson married Ruby Evans of Duluth. Her death occurred in 1897. In 1898 he married Bertha Schmidt who survives him. He is also survived by two sons, Dr. Warren E. Wilson of Northfield and Paul S. Wilson, who is superintendent of schools at Glencoe. A sister and three brothers reside in Ontario.

Dr. Wilson drew the plans and assisted in the management of the hospital established at Northfield by the Odd Fellows of Minnesota. Ten years later he took a leading part in the establishment of the hospital built by the Northfield Hospital Association. This hospital was eventually turned over to the city. Dr. Wilson was also a member of the Board of Education of Northfield for ten years. An active Mason, he planned the present Masonic lodge quarters at Northfield.

Dr. Wilson was an ardent golfer and became much interested in woodcraft in his later years. In his passing Northfield has lost a valuable citizen, a man of sound character and outstanding achievement.

Cobra Venom in Arthritis

For a number of years various venoms, especially those of bees and snakes, have been used in the treatment of a variety of diseases. Of commercial preparations of different venoms, those of bees have been most widely used. No extensive scientific study has been made concerning the value of cobra (or bee) toxins in chronic arthritis. Many believe that such relief as arthritis patients may obtain from bee or snake venoms is probably derived from a reaction somewhat similar to that from foreign proteins (milk, typhoid vaccine). The value of snake venom as a superior coagulant is more definitely established. (J. A. M. A., Oct. 2, 1937, p. 1143.)

accidents occurred at home and another quarter were due to automobile accidents.

The rise in the number of automobile accidents from 2,100 in 1911 to 34,000 in 1934 is disgraceful and indicates the marked improvement which must have taken place in the occurrence of other accidents. Something will have to be done about it, but the solution is not clear.

The remarkable improvement in public health during the past twenty-five years should be a source of satisfaction to all these agencies devoted to health activities. The analysis of mortality statistics presented in this volume indicates where the attack should be made by medical as well as other agencies to increase life expectancy further.

MEDICAL BROADCAST FOR JANUARY

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 9:45 o'clock every Saturday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota. The program for the month will be as follows:

- January 1—Public Health Objectives
- January 8—Pneumonia Types
- January 15—Measles Prevention
- January 22—Early Tuberculosis
- January 29—Preventive Dentistry

Vaccines in Colds

All investigations to date have consistently shown a wide variety of bacteria present in colds. This fact necessitates the assumption either that colds are not due to any specific organism but that symptoms which we recognize by that term can be produced by a large number of different bacteria, or that the specific cause has not yet been identified. It is evident, therefore, that that any attempt made now to produce immunity by vaccines must be aimed at a combination of organisms, with the hope of chance inclusion of the right one, or that the combination also by accident contains the as yet unidentified principle which causes all colds. Neither of these possibilities seems to offer a scientifically rational approach to prophylaxis. The duration of acquired immunity is another important question. There is no real scientific evidence supporting the use of vaccines for the common cold. In those individual instances in which benefit seems to result, this apparent effect may be due either to the individual fluctuation in frequency which is generally observed or to some nonspecific stimulation of immunity created by the administered proteins. (J. A. M. A., Oct. 9, 1937, p. 1217.)

JANUARY, 1938

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.
L. H. Rutledge, M. D.

W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.
A. N. Collins, M. D.

The Council Meets

THE following resolution was passed by the Council in connection with acceptance by the Council of the 1938 budget presented by Dr. H. Z. Giffin, Rochester, chairman of the Finance Committee of the Council:

"Doctor Meyerding has been on leave of absence, without salary, as to active executive duties since September 1, 1937. Mr. Rosell has been assuming responsibility under the direction of the Finance Committee for office administration and management except as to bookkeeping, receipt of mail, and custody of important documents, which have continued as under the previous regime. Bonds are required for those assuming such duties.

"The Finance Committee, in coöperation with Doctor Meyerding, has arranged for the transference of responsibility for the bookkeeping system, the custody of important documents, the opening of all mail, except that with Doctor Meyerding's name on it, and all other activities to Mr. Rosell. It has been suggested that proper bonding and other safeguards such as insurance, as well as transfer of bookkeeping, shall be completed before January 1, 1938. The books have been reviewed as of August 31, 1937, and found to be correct.

"The Council, in confirming this transfer of office management, offers the following resolution to be spread upon the minutes:

"The advantage of the past coöperation between the Minnesota Public Health Association and the Minnesota State Medical Association is fully recognized, and it is desirable that the coöperation continue as far as possible.

"The valuable services of Doctor Meyerding over a period of thirteen years in his capacity as active secretary of the Minnesota State Medical Association are appreciated by all and especially by those who best know of the struggles of the past thirteen years which have placed Minnesota medicine in its present high ranking.

"Our Association has grown and developed in many directions during Doctor Meyerding's administration. Outstanding among his services are: the growth of our membership; committee activities; development of

the component society; the interesting of the county medical group in local medical relief and welfare; county contact committees; administration of finance; the public health education program; the medical economics education program; and the growth of the annual meeting with its scientific and technical exhibits. More important than all of these is our present close and friendly relationship with all large official and voluntary agencies and associations of the State.

"There never was a time when unity of thought and action on the part of all interested in public welfare and the advancement of medicine was more necessary than it is now. It is the desire and hope of the Council that Doctor Meyerding, although not responsible as to active duties, should be freely consulted regarding policies affecting the practice of medicine. We deeply appreciate the fact that he has volunteered such aid."

Thanks of the Council were extended to Doctor Giffin and members of his committee for their work.

Ready to Publish

Only a small amount of work remains to be done to complete the "History of Medicine in Minnesota" as it has been planned by the Historical Committee.

The date 1900 was chosen arbitrarily by the committee as the ending point for the history. In view of the impossibility of tracing the history of every society in the state, the committee has followed the early lines of transportation and will cover most of the settlements where pioneer medical men established themselves.

The compilation represents much devoted research on the part of members of the committee and others who have assisted them. It was close to the heart of the late Dr. H. M. Workman, for many years chairman of the Council, and it has been a major interest of Dr. Arthur S. Hamilton of Minneapolis, previous chairman, who was forced by illness to relinquish the

work, also to the present chairman, Dr. John M. Armstrong of St. Paul.

Doctor Armstrong reported upon the progress of the work, and the Council voted unanimously to publish it serially, under the editorship of Doctor Armstrong, in MINNESOTA MEDICINE.

The Council also voted an expression of appreciation for the work of Doctor Armstrong and his associates.

Care for Work Camps

The Treasury Department has asked for bids for regular sanitary inspection and medical care in the work camps of the Resettlement Administration in Northern Minnesota. Some of these camps are at some distance from resident doctors and require considerable time of the attending physician.

It is recognized that procedure for care of these camps is dictated from Washington and must be followed. The Council suggested, however, that the county societies involved make an arrangement as societies with the camp administration in St. Paul to do the work. County society members, in turn, could assign the job to the man or men nearest the camp and make mutually agreeable division or assignment of the funds.

In general, this is the scheme known as the "Iowa Plan," used first to handle care for the indigent, but well adapted, also, for special work such as care for the men in the work camps. The object, of course, is to avoid objectionable competitive bidding on contracts for medical work.

Interprofessional Meetings

Interprofessional meetings in each county and district society were approved by the Council at this meeting. These meetings are being suggested by the Interprofessional Relationship Committee of the state association, of which Dr. F. J. Savage is chairman. They are to be informal gatherings at which representatives of all the professions get together, become acquainted with mutual problems, unite for better community action on health problems. A yearly public health meeting sponsored by the entire interprofessional group is a further suggestion of the committee which met with Council approval.

These gatherings should be kept informal and without regular constitution or elected officers, in the opinion of Council and committee, since organizations thus formed are sometimes used by participating groups for purposes not contemplated by the founders.

A letter detailing the aims and purposes of these meetings has been sent to all secretaries by the Interprofessional Committee.

County Officers' Meeting

The 1938 County Officers' Conference of the State Association will be held Saturday, February 26, at the Saint Paul Hotel, Saint Paul. The date was approved by the Council and a request has subsequently been sent to all secretaries by Executive Secretary R. R. Rosell, for suggestions as to subjects that will be of most value at this meeting.

Survey in California

The California survey of sickness and sickness costs is complete at last and available to students of the subject.

This survey covers the years 1934-1935 and cost the California State Medical Association \$50,000, the Federal government approximately \$55,000, the California Dental Society \$800, the whole making a grand total of \$102,352.66.

The studies cover the medical vicissitudes of 60,033 persons out of a population of more than 5,000,000. Subject to inquiry was the general character of the population, its income, its morbidity, the medical facilities available, the extent to which they are utilized, likewise the extent to which the cost might have been instrumental in curtailing their use.

Out of the 60,003, a group of 8,260 were discovered who were in need of medical care. Of these, 4,810 were receiving care at the time of the interview, leaving 3,459, or 5.7 per cent, presumably in need of care which they were not receiving. Not a very large percentage, surely, when you consider that some of the 5.7 per cent undoubtedly did not desire medical care whether they needed it or not.

There are, in California, some 9,000 physicians licensed to practice medicine; also, 1,403 osteopaths, 2,500 chiropractors, 255 drugless

therapists, 39 neuropaths and 2,000 Christian Science practitioners.

This is undoubtedly the most complete survey of its kind ever made in America. Whether it throws sufficient light on a tangled situation to repay the huge expenditure is a matter of opinion. It should be of great interest, however, to all who are concerned in the economic problems of medicine. Copies may be obtained from the office of the California State Medical Association, 450 Sutter Street, San Francisco, for \$2.00.

Syphilis Campaign

The widespread campaign of publicity about venereal disease brings with it definite problems to physicians.

There is no doubt as to the worth and advisability of accurate knowledge about these diseases on the part of the public in general and the worth of routine use of the diagnostic measures.

A wave of popular enthusiasm about any health campaign carries with it possibilities of danger, however.

Lay organizers, quacks, ill-advised enthusiasts are likely to take advantage of it.

The *Journal of the American Medical Association* reports a commercial organization in Los Angeles organized to get money out of restaurants and food handling establishments in exchange for window signs to indicate that employees are free from venereal disease. Decidedly sketchy and unreliable means of vouching for the condition of employees were arranged by this company.

Doctors Must Assist

In Minnesota, the Junior Chamber of Commerce desires to make venereal disease education a major welfare project for the year. It is obvious, of course, that the Junior Chamber is incapable of carrying on any such campaign without assistance. Also it is obvious that the county medical society in every center where such a campaign is started should be the medical agency to direct and assist with the campaign. If the county medical society fails of this duty there are other agencies and individuals that will jump at the chance.

Saint Paul Project

In Saint Paul the Junior Chamber of Commerce was assisted by the Ramsey County Medical Society, with the result that every school, college, luncheon club and many other organized groups were reached by a qualified and especially trained representative of the medical society.

In Pennsylvania a state-wide educational campaign is now in progress under the auspices of the medical association committee. In the course of the campaign free Wassermann tests will be offered to all comers.

Free Tests

Free tests have been considered, also, in one of the Minnesota towns where the Junior Chamber wishes to stage a campaign. The question of whether or not free diagnostic tests should be a feature depends upon the local county medical society. If members approve and are willing to do the work in the name of the county society there can be no more objection to these tests than to other special types of public health work done by medical societies as a unit, for the period of a campaign.

Minnesota is in far better position than many other states to undertake a widespread educational campaign to bring in untreated persons for treatment as well as to extend use of the test as a routine part of every medical examination. The venereal disease program of the State Board of Health has steadily maintained laboratory service for diagnostic tests and provided drugs for those unable to pay for them for many years. There are facilities for the diagnosis and care of the disease in all parts of the state.

Handicapped

Sir Henry Brackenbury, chairman of the council of the British Medical Association, believes that a health insurance plan such as exists in England, Scotland and Wales would be enormously handicapped in the United States.

In the course of informal remarks during a recent visit to this country, Sir Henry made some interesting observations on the subject. They gain significance when it is recalled that he is an often-quoted authority on the English

system and that he has had much to do with establishment of England's rates and rules.

Sir Henry says that whatever success the English system has had is due to the homogeneity of race in England, Scotland and Wales and the likeness of the background of all their peoples. Also to the homogeneity in race-type, general professional training and outlook of their physicians. He attributes its workability, also, to the existence in Britain of a permanent civil service personnel possessed of continuous and definite authority to carry out the law, no matter what political group names the nominal heads of departments.

In the United States the difference in standards and backgrounds of the people, the differences in education and licensure of physicians from state to state and the inevitability of political control in any conceivable plan for compulsory health insurance would provide serious obstacles to success.

"1938 What"

(Monthly Editorial Prepared by the Medical Advisory Committee)

"Thank you for your interest and help in my case. I appreciate the support of the State Association more than I can say."

The above is a part of a recent letter received by your Medical Advisory Committee from one of the State Association's members following the dismissal of his case.

Only one who has gone through the ordeal of anxiously waiting for the time of trial, torn between a feeling of guilt and innocence of wrongdoing, can appreciate the sense of relief felt by the man who penned these words. His was the prayer of thanks, his the evidence of applied friendship.

Could every man, each member of the Association, step into his place and feeling, we should have an Association cemented together by the common ties of mutual interest such as nothing else could do.

There can be no middle road in 1938 in dealing with the unwarranted malpractice case. If the case is one of clear responsibility on the part of physician or surgeon, the aggrieved party should be settled with. If the case is one of the usual type, purely a money-making scheme, it should be fought through all courts. Remember that, in your committee's experience,

one illegitimate case settled means at least two more will be brought in the same community within a short time.

The time is now ripe to apply that familiar phrase, "All for one and one for all." Let's make the new year a year of renewed friendships, forgotten disagreements, and forgiven quarrels. We will need patience, perseverance, endurance, and clear, concise, mutual understanding with the many problems that now beset medical practice and our Association's welfare.

Pepys in Minnesota

November 12.—More merciless days of dredging through masses of writings and what not and more than ever attracted by "Assignment in Utopia," in which Eugene Lyons tells of seven years in Russia. So now in Saint Paul, where some hundreds of doctors have feted Meyerding. At breakfast came editors of the press and then interviewers and photographers, and then to speak to the Christmas seal workers, and after that to the Junior Chamber of Commerce to speak on syphilis; and old Pepys reminded them that we must look for syphilis not only in the Junior Chamber but also in the Junior League. Next with Ben Wright to Minneapolis to speak on the radio, and after that to the annual dinner of the health association. Now here came Myers and Slater and many more, and a town crier rang out the call and an a cappella choir (no accompaniment, thank you) sang merrily. So old Pepys talked some more and a local medico came up to Mistress Pepys and said: "Your father made a swell speech"; so old Pepys decided to begin dieting again.

November 13.—At 7:30 to breakfast with the officers and council of the state medical society, talked of this and that and speaking of planning heard Chesley tell of the man in Maine where the fog was so thick that when he went up to shingle the roof and the fog cleared suddenly, he fell in the manure pile because he had shingled out ten feet from the barn onto the fog. And Adson spoke well and also Light, and then all went to see Minnesota perform against Northwestern 7 to 0; so now I get my \$5.00 back. At night driving to Rochester in a blinding snow and an airplane is safer.—From Tonics and Sedatives, Pepys' Diary, *Journal of the American Medical Association*, November 27.

Illegal

Acting Comptroller-General Elliott has declared the medical plan of the Homeowners' Loan Corporation illegal. This HOLC plan provides group sickness insurance for its employees and it was financed by \$40,000 of Federal funds.

In view of the special status of the HOLC the opinion of the Comptroller-General must be viewed as purely advisory. There is no specific prohibition by Congress for the action and, in any case, the money is already spent.

Minnesota State Board of Medical Examiners

Worthington Osteopath Fined \$250.00 and Costs For Unlawful Practice of Medicine

State of Minnesota vs. Dunn.

On November 30, 1937, Donald J. Dunn, forty-five years of age, entered a plea of guilty to an information charging him with practicing medicine without a license. Dunn, who holds a license to practice osteopathy, but not medicine, and who maintains an office at Worthington, Minnesota, was sentenced by the Honorable Charles A. Flinn, Judge of the District Court, to pay a fine of \$250.00 plus the court costs, or serve four months in the Nobles County Jail. Dunn paid the fine plus court costs of \$6.90, or a total of \$256.90.

The Minnesota State Board of Medical Examiners had received a number of complaints that the defendant was injecting medicine and furnishing medicine to be taken internally. The investigation disclosed that Dunn had written a number of prescriptions to be taken internally, but that he had neither written the name of the patient upon the prescriptions, nor had he signed them. The particular case upon which a complaint was filed concerned a young man who stated that he consulted the defendant and had been advised that he was in a run down condition and suffering from an inflammation of the kidneys and the bladder. He stated that the defendant gave him a number of hypodermic injections in the arm and some pills to be taken internally. He stated that he also received a bottle of so-called blood medicine to be taken internally and a written prescription for a second bottle of the same medicine. He stated that he received a bill from the defendant in the sum of \$162.00. The patient stated that he did not get any better and, upon consulting a physician, was advised that he was suffering from a different condition from that stated by the defendant. He also stated that he has made considerable improvement since being under medical care.

The osteopathic law of Minnesota specifically provides that the practice of osteopathy

"is hereby declared distinct from that of medicine or surgery * * * Osteopathic physicians, when duly licensed, shall have the right to practice osteopathy * * * including the use and administration in connection with the practice of obstetrics, minor surgery and toxicology only of anesthetics, narcotics, antidotes and antiseptics."

The law also provides:

"Except as hereinbefore expressly authorized as to the administration of anesthetics, narcotics, antidotes and the use of antiseptics, the license shall not authorize the holder to give or prescribe drugs for internal use."

—Section 5736-5737, Mason's Minnesota Statutes for 1927.

Itasca County Practitioner Pleads Guilty

Re: State of Minnesota vs. Smith

On December 10, 1937, Christopher Columbus Smith, seventy-seven years of age, entered a plea of guilty to an information charging him with practicing healing without a basic science certificate. Smith entered his plea of guilty before the Honorable Graham M. Torrance, Judge of the District Court at Aitkin, Minnesota. After hearing the facts, Judge Torrance sentenced Smith to a term of four months in the Itasca County Jail, and placed him on probation until September 13, 1938, on a number of conditions, two of which are that Smith absolutely refrain from practicing medicine in any manner, or from holding himself out to the public as a physician.

Smith moved into northern Itasca County in 1920,

and resided on a farm about a mile east of Effie. In 1930 he was given a warning by the State Board of Medical Examiners to refrain from practicing medicine, and he stated, at that time, that if given an opportunity he would return to the State of Texas. However, he did not leave and in 1933, following a fire, he moved into Effie, where he built a small place and has continued to practice medicine until the time of his arrest on December 9, 1937. Smith stated to the Court that he was born in Fannin County, Texas, and raised in Davis County, Missouri. He stated that he attended the old Medical School at Keokuk, Iowa, graduating in 1885, and being licensed by the Iowa State Board of Medical Examiners in 1886, holding license number 1050. He also stated that he had never been convicted of a crime. Judge Torrance warned the defendant that under no circumstances could he be permitted to practice medicine. It was stated to the Court that the sanitary conditions at Smith's residence, where he maintained his office, were very bad.

The State Board of Medical Examiners wishes to acknowledge the fine cooperation of John J. Benton, County Attorney, and Sheriff Elmer Madson.

List of Physicians Licensed by The Minnesota State Board of Medical Examiners, November 12, 1937

By Examination

Name	School	Address
Arkin, Archie Abraham, U. of Manitoba, M.D., 1932, Minneapolis, Minn.		
Beizer, Lawrence, Harvard U., M.D., 1934, Rochester, Minn.		
Bellis, Carroll Joseph, U. of Minn., M.B. and M.D., 1936, Minneapolis, Minn.		
Benesch, Louis Alfred, U. of Minn., M.B., 1937, Minneapolis, Minn.		
Benkwitz, Karl Burton, U. of Rochester, M.D., 1934, Minneapolis, Minn.		
Bennett, Robert Leo, Jr., U. of Pittsburgh, M.D., 1936, Rochester, Minn.		
Berlin, Anthony Salvatore, U. of Minn., M.B. and M.D., 1937, St. Paul, Minn.		
Black, Benjamin Marden, Stanford U., M.D., 1936, Rochester, Minn.		
Black, John Robert, McGill U., M.D., 1934, Rochester, Minn.		
Boysen, John Edward, U. of Minn., M.B., 1936; M.D., 1937, Pelican Rapids, Minn.		
Brown, Henry Allen, Med. Col. of Va., M.D., 1934, Rochester, Minn.		
Browne, Harry C., Jr., U. of Ore., M.D., 1935, Rochester, Minn.		
Brumm, Harold J., Rush Med. Col., M.D., 1936, Rochester, Minn.		
Cabell, Charles Lorraine, U. of Va., M.D., 1934, Rochester, Minn.		
Cameron, David Molloy, U. of Texas, M.D., 1935, Rochester, Minn.		
Conway, John Francis, U. of Rochester, M.D., 1935, Rochester, Minn.		
Cottrell, Lillian, U. of Colo., M.D., 1936, Minneapolis, Minn.		
Cowan, Donald William, U. of Minn., M.B., and M.D., 1931, Minneapolis, Minn.		
Craft, Charles Brigman, Tulane U., M.D., 1935, Minneapolis, Minn.		
Davies, Roberts Judson, U. of Minn., M.B., 1933; M.D., 1934, Nopeming, Minn.		
Dees, Myrta Susan Coons, Johns Hopkins, M.D., 1934, Minneapolis, Minn.		

MEDICAL ECONOMICS

Delmonico, E. Joseph, Syracuse U., M.D., 1930, Rochester, Minn.
 Dublin, William Brooks, U. of Cal., M.D., 1936; Rochester, Minn.
 Engle, David Edwin, Indiana U., M.D., 1934, Rochester, Minn.
 Foster, Furman Lamar, U. of Minn., M.B., 1936; M.D., 1937, Minneapolis, Minn.
 Freedman, Harold Charles, U. of Minn., M.B., 1937, Minneapolis, Minn.
 Freeman, William Neil, U. of Chicago, M.D., 1937, St. Cloud, Minn.
 Goodson, William Hammack, Jr., Harvard U., M.D., 1934, Rochester, Minn.
 Grindlay, John Happer, Harvard U., M.D., 1935, Rochester, Minn.
 Grove, M. Stuart, U. of Minn., M.B., 1934; M.D., 1935, St. Paul, Minn.
 Hammer, Howard John, Wayne U., M.B., 1934; M.D., 1935, Rochester, Minn.
 Heise, William von Rohr, Northwestern, M.B., 1934; M.D., 1935, Winona, Minn.
 Hildebrand, Alice Grace, U. of Neb., M.D., 1936, Rochester, Minn.
 Judd, Edward Starr, Jr., Rush Med. Col., M.D., 1937, Rochester, Minn.
 Kernan, Phillip Donald, U. of Wis., M.D., 1933, Minneapolis, Minn.
 Kimmel, George Charles, Jr., U. of Minn., M.B., 1936; M.D., 1937, Minneapolis, Minn.
 Koch, Eleanor Alice Steele, Johns Hopkins, M.D., 1934, Rochester, Minn.
 Lange, Elizabeth Greason Hunter, U. of Mich., M.D., 1928, Minneapolis, Minn.
 Leighton, Robert Sisson, II, U. of Minn., M.B., 1937, Minneapolis, Minn.
 Madding, Gordon Francis, Northwestern, M.B., 1936; M.D., 1937, Rochester, Minn.
 Mitchell, Mancel Talcott, U. of Minn., M.B., 1934; M.D., 1935, Minneapolis, Minn.
 Muir, Walter Francis, U. of Minn., M.B. and M.D., 1937, Graceville, Minn.
 O'Brien, Louis Timothy, U. of Minn., M.B., 1935; M.D., 1936, Wahpeton, N. Dak.
 Olds, John Whitney, Rush Med. Col., M.D., 1936, Rochester, Minn.
 Pearman, Robert Oliver Davidson, Harvard U., M.D., 1935, Rochester, Minn.
 Peters, Stanley Bruce, U. of Rochester, M.D., 1935, Virginia, Minn.
 Ralph, Robert Douglas, Queens U., M.D., 1932, Rochester, Minn.
 Schiele, Burtrum Clarence, U. of Colo., M.D., 1931, Minneapolis, Minn.
 Schmitz, Anthony A., U. of Minn., M.B., 1937, Minneapolis, Minn.
 Schneider, Herbert Hoyt, U. of Kansas, M.D., 1936, Rochester, Minn.
 Seedorf, Everett Emil, U. of Wis., M.D., 1936, Rochester, Minn.
 Seldon, Thomas Harry, Queens U., M.D., 1929, Rochester, Minn.
 Skinner, Ira Clifton, Jr., Tulane U., M.D., 1935, Rochester, Minn.
 Smith, Baxter Allen, Jr., U. of Minn., M.B., 1936; M.D., 1937, Minneapolis, Minn.
 Spink, Wesley William, Harvard U., M.D., 1932, Minneapolis, Minn.
 Sturley, Rodney Francis, U. of Minn., M.B., 1937, Minneapolis, Minn.

Swartz, Frederick Charles, U. of Cincinnati, M.B., 1931; M.D., 1932, Rochester, Minn.
 Templin, David Browning, U. of Chicago, M.D., 1937, Rochester, Minn.
 Thomas, Margaret Jane, U. of Minn., M.B., 1936; M.D., 1937, Minneapolis, Minn.
 Trach, Benedict, U. of Minn., M.B., 1937, Chicago, Ill.
 Trueman, Kenneth Rankine, U. of Manitoba, M.D., 1934, Rochester, Minn.
 Vickers, Paul Merton, U. of Minn., M.B., 1936; M.D., 1937, Rochester, Minn.
 Waisman, Morris, U. of Ill., M.D., 1936, Rochester, Minn.
 Watterson, Kenneth Ward, U. of Pittsburgh, M.D., 1929, Rochester, Minn.
 Wellman, Thomas Gibbs, U. of Minn., M.B. and M.D., 1937, Lake City, Minn.
 Wollaeger, Eric Edwin, Harvard U., M.D., 1934, Rochester, Minn.

By Reciprocity

Dix, Christopher Robert, U. of Wis., M.D., 1935, Rochester, Minn.
 MacKay, Alexander Russell, Northwestern, M.D., 1936, Rochester, Minn.
 Walsh, John Joseph, Jefferson, M.D., 1935, Rochester, Minn.
 Rosenblatt, Louis Mayo, U. of Nebr., M.D., 1932, St. Paul, Minn.
 Langmack, William August, Marquette U., M.D., 1936, Cloquet, Minn.
 Leland, John Augustin Charles, Jr., Jefferson Med. Col., M.D., 1936, Minneapolis, Minn.
 Soniat, Theodore Louis Lucian, Tulane U., M.D., 1935, Rochester, Minn.

National Board Credentials

Hartwell, Donald Clifford, Col. of Med. Evang., M.D., 1937, Wayzata, Minn.
 Harris, William Elsworth Stanley, U. of Minn., M.B., 1936; M.D., 1937, St. Paul, Minn.
 Pratt, Sidney Charles, U. of Minn., M.B., 1936; M.D., 1937, Minneapolis, Minn.
 Sather, George Allen, Rush Med. Col., M.D., 1937, Fosston, Minn.



**If you haven't sent in
 your Christmas Seal
 money, do so now!**

OF GENERAL INTEREST

Dr. Albert Goblirsch of Faribault was recently married to Miss Dorothy Fraser of Minneapolis.

* * *

Dr. M. J. Lindahl of Pipestone has moved to Sherburn, where he will practice medicine.

* * *

Dr. W. B. Beadie of Cannon Falls conducted a chest clinic early in December.

* * *

Dr. S. A. Whitson of Alden is taking postgraduate work in major surgery at the Cook County Hospital, Chicago.

* * *

Dr. Ralph E. Moyer of Minneapolis has recently been appointed to the staff at the Minnesota State School and Colony in Faribault.

* * *

Dr. Edmund V. Pelletiere of Thief River Falls was recently married in New Orleans. Dr. and Mrs. Pelletiere are now at home in Thief River Falls.

* * *

Dr. John A. Tweedy has become affiliated with his father, Dr. G. J. Tweedy, and his brother, Dr. R. B. Tweedy, of Winona, in the practice of medicine.

* * *

Dr. J. C. Masson and Dr. A. W. Adson of Rochester left early in December for a three-weeks' fishing and hunting trip in Texas and New Mexico.

* * *

A number of Willmar physicians and their wives were recently entertained by the nurses of the Rice Memorial Hospital at a housewarming for the nurses' home next to the hospital.

* * *

Dr. F. E. Harrington, Commissioner of Public Health in Minneapolis, began a new series of health talks over KSTP on December 22, at 11:15 A.M. The program is being sponsored by the Glenwood-Inglewood Pure Spring Water Company.

* * *

Dr. and Mrs. F. U. Davis of Faribault started early in December on an extended trip throughout the southern states, Mexico and California. They are traveling in their modern and well equipped house trailer. They expect to return to Faribault in the spring.

February 2, 1938, has been designated as National Social Hygiene Day by the American Social Hygiene Association for the purpose of eliciting interest in the various activities directed against venereal disease.

The Association, with headquarters at 50 West 50th Street, New York City, will supply interested persons or groups with suggestions for meetings and materials such as exhibits, films and literature upon request.

* * *

Dr. Wilder Penfield of Montreal, Canada, Director of the Neurological Institute and Professor of Neurosurgery at McGill University, will give the fifth E. Starr Judd Lecture at the University of Minnesota in the Medical Science Amphitheater on Wednesday, February 2, at 8:15 p. m. The subject of Dr. Penfield's lecture is "Cerebral Circulation in Epilepsy." The late E. Starr Judd, an alumnus of the Medical School of the University of Minnesota, established this annual lectureship in surgery a few years before his death.

* * *

Excerpt from a recent letter from the Secretary of the United States Treasury to the Attorney-General: (Appointment of Consulting Specialists in Psychiatry by the U. S. Public Health Service)

"The Department has, upon the recommendation of the Surgeon-General, appointed as Consulting Specialists in Psychiatry the following physicians: Dr. Joseph C. Michael, 1945 Medical Arts Bldg., Minneapolis, Minn.; Dr. Ernest Martin Hammes, 1125 Lowry Medical Arts Bldg., Saint Paul, Minn.; Dr. William Howard Hengstler, 1068 Lowry Medical Arts Bldg., Saint Paul, Minn.; Dr. Gordon R. Kamman, 350 St. Peter Street, Saint Paul, Minn., and Dr. Frank White Whitmore, 1017 Lowry Medical Arts Bldg., Saint Paul, Minn. . . . These specialists will, upon the request and only upon the request of the court, examine any person held pursuant to a law of the United States, and will submit consultative advice and report to the court showing the mental status of such person or the need of further mental examination and observation.

"The Department desires to take this opportunity of stressing the fact that the nature of the service to be furnished under the above arrangement is consultative and advisory to the court, and also wishes to invite attention to the importance of a realization on the part of all judicial, prosecution, and enforcement officers, as well as defense counsel, that this service is not for the purpose of determining the guilt or innocence of an accused; it is intended only to assist the court to determine the mental state of a defendant as one element in the problem of the disposition to be made of a case."

REPORTS and ANNOUNCEMENTS

1938 AMERICAN MEDICAL ASSOCIATION MEETING—SAN FRANCISCO

When San Francisco was selected as the host city for the 1938 Annual Session of The American Medical Association, the profession of this Golden Gate Metropolis promptly initiated plans for the comfort, pleasure and entertainment of all who come to that national meeting. A local executive committee on arrangements, composed of five members with Doctor Howard Morrow as General Chairman and Doctor Frederick C. Warnshuis as General Secretary, and eighteen sub-committees have been busy since July in developing plans and local arrangement details. Their objective is the biggest, best, and most memorable annual session in the history of the American Medical Association.

Atlantic City, Kansas City, Cleveland, Detroit, with their known facilities and attractions, have been host cities in recent years, and have justified their selection as meeting places. However, and without disparagement, none of them possess the background, the setting, the resources, the history and romance, or the facilities that are found in San Francisco and in the great state of California—the Golden Bear Empire of the Pacific Coast. To reveal these, to extend California's and San Francisco's noted hospitality, and to cause those who plan to attend the 1938 session to experience ten days of profit and pleasure midst the environs of the annual meeting city, is the goal toward which the local profession is pointing.

The Local Committee on Arrangements cordially invites the profession of the country to be San Francisco's guests this coming June. Decide now to attend the 1938 American Medical Association Meeting and plan accordingly. During the coming months an insight to some of the feature functions will be disclosed, but the final details and program of events will not be revealed until you arrive. You will long regret it if you fail to attend the coming national meeting. Talk it over tonight with the good wife and your professional associates, and join the party of your state members that is coming to San Francisco—June 12th to 17th, 1938.

THE AMERICAN BOARD OF INTERNAL MEDICINE

The American Board of Internal Medicine will hold its next written examination on Monday, February 14, 1938, in various centers of the United States and Canada.

The examination will consist of two sessions of three hours each with the morning session held at 9:00 o'clock a. m. and the afternoon session held at 2:00 o'clock p. m.

The candidates who are successful in this written

examination will be eligible to take the practical examination which will be held in San Francisco the Friday and Saturday prior to the opening of the Annual Session of the American Medical Association in June, 1938.

The final date for filing applications for this written examination is January 15, 1938, and all applications should be in the office of the chairman before that date.

For further particulars and application blanks please address Dr. Walter L. Bierring, M.D., Chairman, American Board of Internal Medicine, Suite 1210, 406 Sixth Avenue, Des Moines, Iowa.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

The next examination (written and review of case histories) for Group B candidates who have filed applications will be held in various cities of the United States and Canada, on Saturday, February 5, 1938.

The general oral, clinical and pathological examinations for all candidates (Groups A and B) will be conducted by the entire Board, meeting in San Francisco, California, on June 13 and 14, 1938, immediately prior to the meeting of the American Medical Association.

Applications for admission to the June, 1938, Group A examinations must be on an official application form and filed in the Secretary's Office before April 1, 1938.

For further information and application blanks address Dr. Paul Titus, Secretary, 1015 Highland Building, Pittsburgh (6), Pa.

STATE MEETING

Dr. Howard W. Haggard, of Yale, famous lecturer and writer, is one of several distinguished medical guests who will address the Minnesota State Medical Association at its 85th Annual Meeting in Duluth, June 29, 30 and July 1, at the Hotel Duluth.

Dr. Haggard will talk to the doctors at the banquet to be held on the evening of June 30. He will also address an evening health meeting to which the public is to be invited.

Dates for the meeting were set in advance of the Fourth of July holiday and at the beginning of the vacation season in the North, so that physicians and their families could combine a vacation with attendance at the meeting.

Medical men from all of the Northwest states are expected to take advantage of the opportunity.

The scientific program, now practically completed, calls for sessions on fractures, on obstetrics and pediatrics, eye, ear, nose and throat, and on use of newer drugs, also a session of clinics in the Duluth hospitals.

Exhibits and demonstrations will be a feature of the meeting.

INSTITUTE IN OPHTHALMOLOGY AND OTOLARYNGOLOGY

January 17 to 22, 1938

The next seminar for medical graduates at the Center for Continuation Study of the University of Minnesota will be on Ophthalmology and Otolaryngology, January 17 to 22, 1938. The program will occupy the full time of the physicians from Monday morning to Saturday evening. There will be no evening lectures, but a feature of the institute will be a joint meeting on Friday evening, January 21, with the Minnesota Academy of Ophthalmology and Otolaryngology.

The seminar will consist of clinics, round table discussions, and lectures illustrated by lantern slides, charts or patients. The teaching staff has been selected from the Departments of Ophthalmology and Otolaryngology of the University Medical School, Minneapolis, the Mayo Clinic, Rochester, and the General Extension Division. The meetings will be held in the Center for Continuation Study, and in the University of Minnesota Hospitals and affiliated institutions in Minneapolis and St. Paul.

It is to be noted that much of the course will be devoted to intimate clinical instruction or conferences. Those who plan to register should make their reservations as soon as possible so that proper arrangements can be made for the clinics.

Program

Monday, January 17, 1938

Morning

- 9:00-10:00 The Early Diagnosis and Treatment of Hearing Deficiencies, Dr. Newhart.
- 10:00-11:30 Operative Clinic, University Hospitals, Drs. Boies and Bryant.
- 11:30-12:30 Pathology of Ear, Nose and Throat Diseases, Dr. Connor.

Afternoon

- 2:00- 3:00 Dispensary Clinic, University Hospitals, Drs. Boies and Fjelstad.
- 3:00- 4:00 Malignant Tumors of the Larynx, Dr. New.
- 4:30- 6:00 Round Table, Surgery of Acute Mastoiditis, Dr. Boies.

Tuesday, January 18, 1938

Morning

- 9:00-10:00 Pitfalls in Diagnosis and Treatment of Diseases of the Eye, Dr. J. S. Macnie
- 10:00-11:00 External Diseases of the Eye, Dr. Pfunder.
- 11:00-12:00 Pathology of Eye Diseases, Dr. Camp.

Afternoon

- 2:00- 3:00 Dispensary Clinic, University Hospitals, Dr. Hymes and Associates.
- 3:00- 4:30 Eye Operative Clinic, University Hospitals, Dr. J. S. Macnie.
- 5:00- 6:00 Round Table, Ophthalmological Problems, Dr. Benedict.

Wednesday, January 19, 1938

Morning

- 9:00-12:00 Dry and Operative Clinics, Ancker Hospital, St. Paul, Drs. Leavenworth, Hochfilzer and Associates.

Afternoon

- 2:00- 3:00 Endoscopic Procedures with Special Reference to Hoarseness and Dysphagia, Dr. Phelps.
- 3:00- 4:00 Management of Acute and Chronic Sinusitis, Dr. Bryant.
- 4:30- 6:00 Round Table, Nasal Obstruction, Dr. Hochfilzer.

Thursday, January 20, 1938

Morning

- 9:00-10:00 Surgery of Optical Muscles, Dr. Grant.
- 10:00-11:00 Fundus Findings in Blood Dyscrasias, Dr. Stanford.
- 11:00-12:00 Ocular Neurology, Dr. Ed. Burch.

Afternoon

- 2:00- 3:00 Dispensary Clinic, University Hospitals, Dr. Hanson and Associates.
- 3:00- 4:00 Eye Operative Clinic, University Hospitals, Dr. J. P. Macnie.
- 5:00- 6:00 Round Table and Pictures, Intraocular Operation, Dr. Spratt.

Friday, January 21, 1938

Morning

- 9:00-10:00 Demonstrations of Neurology of Eye, Ear, Nose and Throat, Room 214, Anatomy Building, University, Drs. Rasmussen and Newhart.
- 10:00-11:30 Operative Clinic, University Hospitals, Drs. Boies and Williams.
- 11:30-12:30 The Management of Chronic Otitis Media, Dr. Williams.

Afternoon

- 2:00- 3:00 Dispensary Clinic, University Hospitals, Drs. Newhart, Delavan and Bryant.
- 3:00- 4:00 Physiology of the Nose as the Basis for Treatment, Dr. Hilding.
- 4:30- 6:30 Round Tables (Visiting Clinicians). Section I, Ear, Nose and Throat; Section II, Eye.
- 6:30 Dinner meeting with Minnesota Academy of Ophthalmology and Otolaryngology. Speakers: Dr. J. P. Macnie, "Detached Retina"; and Dr. Thomas C. Galloway, in the Ear, Nose and Throat field, subject to be announced later by the Academy.

Saturday, January 22, 1938

Morning

- 9:00-10:00 Photography of Fundus, Dr. Fellows.
- 10:00-11:00 Ophthalmoscopy, Dr. Rucker.
- 11:00-12:00 Some Clinical Problems in Refraction, Dr. Prangen.

REPORTS AND ANNOUNCEMENTS

Afternoon

- 1:00-3:30 Refraction Clinic, University Hospitals, Drs. Houkom, Hymes and Sandt (with a lecture by the latter on Contact Glasses).
3:30-4:30 Allergy of Eye, Ear, Nose and Throat, Dr. Hilding.
5:00-6:00 Round Table, Ocular Muscles and Orthoptics, Dr. Walter Fink.

Faculty

Harold S. Diehl, Professor of Preventive Medicine and Public Health, Dean of Medical Sciences, Medical School, Minneapolis.
James M. Hayes, Assistant Professor of Surgery, President, Minnesota State Medical Association, Minneapolis.
William A. O'Brien, Associate Professor of Pathology, Preventive Medicine and Public Health, Medical School, Medical Representative, Center for Continuation Study, St. Paul.
William L. Benedict, Professor of Ophthalmology, Mayo Clinic, Rochester.
Lawrence R. Boies, Assistant Professor of Otolaryngology, Medical School, Minneapolis.
Edward Burch, Special Lecturer, General Extension Division, St. Paul.
Frank L. Bryant, Instructor of Otolaryngology, Medical School, Minneapolis.
Walter E. Camp, Assistant Professor of Ophthalmology, Medical School, Minneapolis.
Charles E. Connor, Assistant Professor of Otolaryngology, Medical School, St. Paul.
Philip A. Delavan, Instructor of Otolaryngology, Medical School, St. Paul.
Manley F. Fellows, Special Lecturer, General Extension Division, Duluth.
Walter H. Fink, Instructor of Ophthalmology, Medical School, Minneapolis.
C. Alford Fjelstad, Assistant Professor of Otolaryngology, Medical School, Minneapolis.
Thomas C. Galloway, Evanston, Illinois, Guest Lecturer.
Hendrie W. Grant, Clinical Assistant Professor of Ophthalmology, Medical School, St. Paul.
Erling W. Hansen, Assistant Professor of Ophthalmology, Medical School, Minneapolis.
Anderson Hilding, Special Lecturer, General Extension Division, Duluth.
John J. Hochfilzer, Special Lecturer, General Extension Division, St. Paul.
Bjarne Houkom, Clinical Instructor of Ophthalmology, Medical School, Minneapolis.
Charles Hymes, Clinical Assistant Professor of Ophthalmology, Medical School, Minneapolis.
R. O. Leavenworth, Special Lecturer, General Extension Division, St. Paul.
John S. Macnie, Associate Professor of Ophthalmology, Medical School, Minneapolis.
John P. Macnie, Eye Institute, Medical Center, New York City, Guest Lecturer.
Gordon B. New, Professor of Laryngology, Oral and Plastic Surgery, Mayo Clinic, Rochester.
Horace Newhart, Professor of Otolaryngology, Rhinology, and Laryngology, and Director Division, Medical School, Minneapolis.
Malcolm C. Pfunder, Clinical Assistant of Ophthalmology, Medical School, Minneapolis.
Kenneth A. Phelps, Assistant Professor of Otolaryngology, Medical School, Minneapolis.
Avery D. Prangen, Associate Professor of Ophthalmology, Mayo Clinic, Rochester.
Andrew T. Rasmussen, Professor of Anatomy, Medical School, Minneapolis.
Charles W. Rucker, Assistant Professor of Ophthalmology, Mayo Clinic, Rochester.
Karl E. Sandt, Physician, Students' Health Service, Minneapolis.
Charles Spratt, Special Lecturer, General Extension Division, Minneapolis.
Charles E. Stanford, Physician, Students' Health Service, Minneapolis.
Henry L. Williams, Assistant Professor of Otolaryngology, Mayo Clinic, Rochester.

NOTE: Write to the Director for information, Center for Continuation Study, Minneapolis, about this and future institutes.

Medical Diagnosis and Treatment, February 7-12, 1938.
Traumatic Surgery, March 7-12, 1938.
Endocrinology, April 4-9, 1938.
Diseases of Rectum and Colon, May, 1938 (date to be announced).
Diagnostic Radiology, June 6-11, 1938.

EAST CENTRAL MINNESOTA SOCIETY

The East Central Minnesota Medical Society held its annual meeting on November 29, 1937, at the Colony for Epileptics, in Cambridge, Minnesota.

Dr. Donald Brink of Isle, Minnesota, and Dr. George Haliday of Rush City, Minnesota, were elected to membership in the society. Dr. G. L. Richey, formerly of Rochester, Minnesota, was accepted as a transfer into this society.

The following officers were elected for the coming year: Dr. George H. Schiesselman of Anoka, president; Dr. A. B. Roehlke of Elk River, vice president; Dr. Claire M. Ness of Cambridge, secretary-treasurer; Dr. H. C. Cooney of Princeton, delegate; and Dr. W. T. Nordman of Mora, alternate delegate.

Dinner was served and in the evening a scientific program was presented by guest speakers. Dr. A. W. Adson of the Mayo Clinic in Rochester, president of the Minnesota State Medical Society, spoke on the surgical treatment of hypertension. Dr. A. P. Dunnigan of the State Board of Health demonstrated the Neufeld typing in pneumonia and explained the pneumonia service which is now available to physicians in this state.

KANDIYOHI-SWIFT-MEEKER COUNTY SOCIETY

The December meeting of the Kandiyohi-Swift-Meeker County Medical Society was held at the Lakeland Hotel, Willmar, on Wednesday, December 8.

Dr. J. K. Anderson of Minneapolis was the guest speaker, the subject being "The Office Treatment and Diagnosis of the Common Rectal Diseases."

The following officers were elected for 1938: Lennox Danielson, M.D., president-elect; Magnus Pederson, M.D., vice president; C. L. Scofield, M.D., secretary-treasurer; Karl Danielson, M.D., advisory committee, three years; C. L. Scofield, M.D., delegate, and J. C. Jacobs, M.D., alternate.

MOWER COUNTY SOCIETY

These officers of the Mower County Medical Society were all reelected for 1938 at the annual meeting of the society on November 23: President, Dr. Paul C. Leck, Austin; vice president, Dr. R. S. Hegge, Austin; secretary, Dr. Paul A. Robertson, Austin; treasurer, Dr. A. E. Henslin, LeRoy.

PARK REGION MEDICAL SOCIETY

The annual meeting of the Park Region Medical Society was held on Wednesday evening, December 15, at the River Inn at Fergus Falls. About sixty physicians were present.

The principal speakers of the evening were Dr. J. A. Bargen and Dr. H. M. Weber, both of Rochester, Minnesota.

The following officers were elected for 1938: L. C. Combacker, M.D., president; Norman H. Baker, M.D., president-elect; C. J. Lund, M.D., vice president; T. S. Paulson, M.D., treasurer, and C. A. Boline, M.D., secretary.

RAMSEY COUNTY SOCIETY

Dr. R. B. J. Schoch, city health officer of Saint Paul, was elected president-elect of the Ramsey County Medical Society at the last meeting of the Society. Dr. James N. Dunn will take office as president on January 1. Other officers elected for 1938 are Dr. W. D. Brodie, vice president, and Dr. J. Allen Wilson, secretary-treasurer.

RED RIVER VALLEY MEDICAL SOCIETY

The annual meeting of the Red River Valley Medical Society was held at the Hotel Crookston in Crookston, on Tuesday, December 14.

Addresses on different phases of medical economics were given by Dr. L. J. McLeod of Grand Rapids, Dr. B. J. Branton of Willmar, and Dr. W. L. Burnap of Fergus Falls.

The following officers were elected for 1938: Baldwin Borreson, M.D., president; Eskil Erickson, M.D., vice president; C. L. Oppegaard, M.D., secretary-treasurer; J. A. Roy, M.D., and G. A. Morley, M.D., censors; J. F. Norman, M.D., and H. M. Blegen, M.D., delegates to the state convention.

ST. LOUIS COUNTY SOCIETY

Officers for 1938 for the St. Louis County Medical Society are: President, Dr. Malcolm G. Gillespie, Duluth; vice president, Dr. F. W. S. Raiter, Cloquet; president-elect, Dr. Gage Clement, Duluth; secretary-treasurer, Dr. Gordon C. MacRae, Duluth (re-elected); delegate, Dr. Harry Klein, Duluth; alternate, Dr. C. Jacobson, Chisholm.

SOUTHWESTERN MINNESOTA SOCIETY

At the annual meeting of the Southwestern Minnesota Medical Society, the following officers were elected: President, Dr. C. L. Sherman, Luverne; vice president, Dr. J. D. Waller, Wilmont; delegates, Dr. C. L. Sherman, Luverne and Dr. S. A. Slater, Worthington (re-elected); alternates, Dr. J. D. Waller, Wilmont and Dr. W. A. Piper, Mountain Lake. Dr. H. DeBoer was re-elected secretary-treasurer.

WASHINGTON COUNTY SOCIETY

The following officers were elected at the annual meeting of the Washington County Medical Society: President, Dr. Robert P. Ewald, Newport; first vice president, Dr. F. M. McCarten, Stillwater; second vice president, Dr. James H. Haines, Stillwater; secretary-treasurer, Dr. E. Sydney Boleyn, Stillwater (re-elected); delegate, Dr. E. Sydney Boleyn, Stillwater (re-elected); alternate, Dr. W. R. Humphrey, Stillwater (re-elected).

WOMAN'S AUXILIARY

MRS. J. F. NORMAN, Crookston, *President*
MRS. A. A. PASSEE, Olivia, *Editor*

The Woman's Auxiliary again cooperated in the seventh Annual Christmas Seal High School Radio Contest which is sponsored by the Minnesota Public Health Association, and donated the awards. A total of one hundred talks were entered by the high schools of Minnesota and the judges, Dr. Kathleen Jordan of Granite Falls, Miss Melba Hurd of the University of Minnesota, and Mrs. Martin Nordland of Minneapolis, have announced the winners.

The ten best talks were broadcast over WCCO.

Mrs. F. A. Erb of Minneapolis, member of the Hennepin County Auxiliary, was in charge of the downtown Christmas Seal pay station at 612 Marquette Avenue which opened November 28 for the convenience of Christmas shoppers. A large group of volunteers, representing many organizations, assisted Mrs. Erb at the station throughout the holiday season. Proceeds from the sale of Christmas Seals go to support the tuberculosis prevention work.

Hennepin County Auxiliary

The Annual Glen Lake Sale was held at Dayton's November 18, 19 and 20, in charge of Mrs. E. S. Mariette and the Philanthropic Committee of the Hennepin County Auxiliary. The articles for sale are made by the Glen Lake Sanatorium patients and include knitted garments, toys, embroidered linens, leather goods and many novelties. Proceeds of the sale go to the patients.

The Annual Christmas party of the Hennepin County Auxiliary was held in the Hennepin County Medical Library, Friday, December 3, with the Social committee in charge of arrangements. Miss Mae Martin presented three puppet plays. Community singing of carols was led by Mrs. Herbert Jones and gifts were distributed by Mrs. H. B. Hannah, chairman of the Social Committee.

Renville County Auxiliary

Mrs. R. C. Adams, Bird Island, president of the auxiliary, entertained the members at her home Tuesday afternoon, December 7. Following the business session the auxiliary members joined their husbands at a banquet served in the Methodist Church dining hall. Music was furnished by the Bird Island High School Quartet. Dr. W. A. Brand, Redwood Falls, showed moving pictures including the national medical convention in Atlantic City and of the Renville County Society's annual picnic at Green Lake.

Mrs. H. B. Copeland of Cresco, Penn., an instructor in a school for the deaf in New York City, gave a talk on the "Care of Deafness." Very hard of hearing, she is a graduate of the Nitchie lip reading school of New York and did graduate work at Columbia.

PROCEEDINGS of the MINNESOTA ACADEMY of MEDICINE

Meeting of October 13, 1937

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, October 13, 1937. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the president, Dr. E. M. Jones. There were forty-three members present. Minutes of the May meeting were read and approved. The scientific program followed.

BROMIDES, THEIR USE AND ABUSE

GORDON R. KAMMAN, M.D., F.A.C.P.
Saint Paul

Dr. Gordon Kamman read his Inaugural Thesis on the above subject.

Abstract

Due to the increase in functional nervous diseases, more sedatives are being prescribed than formerly. One of these sedatives is bromide, and, in susceptible individuals, bromides may produce mental symptoms even when given in therapeutic doses. The effects of bromide are confined largely to the central nervous system. The drug tends to replace chloride in the blood stream; so, with the administration of bromide, an adequate intake of chloride is necessary to prevent bromide intoxication.

The toxic effect of bromide may be described as simple bromide intoxication or depression, and bromide delirium or psychosis. Blood serum bromide in excess of 150 mgm. per 100 c.c. is said to be in the "toxic zone." The duration of symptoms of brominism following discontinuance of the drug is two to six weeks, and is roughly proportional to the length of time the symptoms existed prior to withdrawal.

The treatment of bromide intoxication consists of discontinuing the drug and all other sedatives; the administration of NaCl orally and parenterally; hydrotherapy, and, in urgent cases, quick acting and rapidly eliminated sedatives. Spinal drainage sometimes helps, and gastric aspiration has been recommended to help eliminate the bromide as the drug is reexcreted into the stomach.

Three probable cases and three proven cases are reported.

Discussion

DR. GEORGE N. RUHBERG, St. Paul: Dr. Kamman is to be congratulated in presenting this timely and practical paper. My experience with bromide poisoning has occurred mainly among two types of cases. The first, in elderly people in whom arteriosclerosis and poor elimination tend to hasten mild symptoms of bromide poisoning. The second, are usually cases of severe functional neurosis, often seen in hospital consultation work, in whom marked symptoms of insomnia, agitation and excitement are present to a more or less marked degree. The usual amounts of sedatives have

not sufficed and, therefore, these have been repeatedly increased and continued until a toxic factor has been definitely established. Many of these cases are noisy and difficult to be taken care of properly in a general hospital. This condition also is seen occasionally in people who do not return to a doctor's office after obtaining an original prescription, but continue on their own, refilling the original until toxic symptoms have developed. In spite of all this, bromides have been, and I believe are, one of our most valuable sedatives when properly used.

DR. W. H. HENGSTLER, St. Paul: I also want to express my appreciation of Dr. Kamman's paper on this very pertinent subject, and the able presentation which he gave. I believe those of us who are interested in psychiatry are beginning to draw away from so much drug medication. We are prescribing less bromide and less of the heavy sedatives than we did ten years ago; and we are turning more to hydrotherapy than we used to. The fact that all people do not react the same way to the same drug must be taken into consideration. The use of bromides in the hospital, where the patient is under close observation, is justifiable, but the office patient should be told that the bromide prescription cannot be refilled without doctor's orders. A great many people know what bromides are and they buy them across the counter at drug stores; and the same is true of a great many other sedatives. We are not prescribing veronal as we used to and, in fact, we are eliminating, as far as possible, the use of all heavy and depressing sedatives.

DR. S. E. SWEITZER, Minneapolis: I wish to congratulate Dr. Kamman on a very fine paper. In a dermatological clinic, it has been my custom to withdraw bromides; most patients are better off without it than with it. As far as retention of bromides in the body is concerned, Wile stated that bromides would stay in the body as long as nine months. Bromide lesions on the skin stay there for a long while and Wile felt that the reason they did last so long was due to the fact that bromide stays in the body for so long; he recommended the use of chloride to eliminate the bromine. A patient who is getting bromine should be watched very carefully for some patients are more susceptible to it than others. Some patients will take only one dose of iodine and get an eruption, and often a small dose of bromine will do the same.

DR. H. Z. GIFFIN, Rochester: Does Dr. Kamman think we should prescribe salt as a routine when we prescribe bromide, and will the administration of salt prevent bromide eruption?

DR. KAMMAN (in closing): I wish to thank the gentlemen for their discussion. In answer to Dr. Giffin, it has been calculated that one should give four times as much chloride as bromide. If bromide and chloride intake are equal, intoxication is likely to occur in about three weeks. I do not know what effect an increased chloride intake would have in the prevention of skin lesions; probably the dermatologists could tell us more about that. Sir William Osler once said that a physician's skill stands in inverse proportion to the amount of opium and opium derivatives he prescribes. I think that remark might be extended to include bromide and embrace the therapeutic efforts of neuropsychiatrists.

THE ADMINISTRATION OF YELLOW BONE MARROW IN AGRANULOCYTIC ANGINA

HERBERT Z. GIFFIN, M.D., and
CHARLES H. WATKINS, M.D.

The Mayo Clinic, Rochester

Dr. H. Z. Giffin read a paper on the above subject.

Abstract

In studies made in 1928 and 1929, on the effects of the administration of bone marrow for secondary anemia, a moderate increase in the number of neutrophils and monocytes was observed in blood smears. This observation led to the administration of bone marrow in cases of granulocytopenia. The first patient with agranulocytic angina in the series was treated with bone marrow in July, 1930. Since then, twenty-four patients with agranulocytic angina have been treated with bone marrow and without other treatment than nursing care. The series includes all cases of agranulocytic angina in which an attempt was made to administer bone marrow, including those in which it was impossible, for one reason or another, to administer a sufficient amount, those in which the patients were in such serious condition that recovery could hardly be expected, and those in which patients had recovered from a former attack but could not obtain bone marrow during the fatal attack at home.

In the response during recovery, the first cells to increase in number are the monocytes, these cells not infrequently increasing to 10 or 20 per cent in the differential count. An increase up to 40 per cent has been observed. Following this, there is an increase in the number of neutrophils as the percentage of monocytes decreases. Myelocytes and even promyelocytes are seen many times during the early period of recovery. The percentage of neutrophils increases steadily to a level of 25 or 30, after which time there is a slower rise. By the end of the second week the percentage of neutrophils is approximately normal and the total leukocyte count is normal or above normal. The blood picture, however, is not regarded as entirely satisfactory until eosinophils and basophils appear.

There is apriori no reason to think that bone marrow should contain a material which produces this effect, as it consists mostly of fat, but, since even the yellow marrow contains many reticular cells and may potentially under stress be replaced by red marrow, there may be some substance retained which, when taken internally, has the power of stimulating the production or maturation of leukocytes.

Early in our experience, small doses of bone marrow were administered, with some benefit; the response was not nearly as rapid, however, as that which has been obtained with larger doses. At present we feel that the initial dose should be from 200 to 300 grains (13 to 20 gm.) daily; one patient was given as much as 800 grains (52 gm.) daily. This necessitates

the swallowing of from 75 to 100 pearls of bone-marrow extract* in twenty-four hours. This is usually not difficult except in cases in which severe ulceration or edema of the larynx is present. After recovery we have reduced the dose of bone marrow, keeping the patients on a maintenance dose of 50 to 100 grains (3.3 to 6.5 gm.) daily, for a period of three or four months longer. By this means, subsequent relapses apparently in most cases have been avoided.

As has been said, twenty-four patients with agranulocytic angina have been treated since 1930. Of this number, three were unable to obtain bone marrow during the fatal attack after having recovered from former attacks while taking bone marrow. Five were unable to take an adequate dose because of extreme illness: ulceration, edema of the larynx, nausea and vomiting. Two patients died even though an adequate dose had been given, one apparently of perforation of the bowel with peritonitis and the other of gas gangrene. The remaining fourteen patients are now living, having recovered from as many as one to four attacks. The total number of attacks in the series was twenty-nine. The number of attacks in which an inadequate dose or no bone marrow at all was given (the patients formerly having received bone marrow) was eight. The number of attacks in which adequate amounts of bone marrow were given and yet in which death resulted were two. Patients recovered from the remaining nineteen attacks. The average percentage of neutrophils on admission was 8, the average percentage ten days later, 58. The average leukocyte count on admission was 1200 per cu. mm. of blood; the average count, ten days later, 7800.

While the results of treatment of agranulocytic angina by any method are especially liable to lead to fallacious conclusions because of the frequency of spontaneous recoveries, our experience with the administration of bone marrow has, nevertheless, been sufficiently satisfactory to warrant a continuation of its administration to the exclusion, at least temporarily, of other methods of treatment such as liver extract, transfusion, and "pentnucleotide." When multiple methods of treatment are used, one cannot arrive at any sort of conclusion concerning the effectiveness of bone marrow or any other form of treatment. An accurate diagnosis is essential, and leukopenic leukemia, particularly of the monocytic type, and aplastic anemia, must especially be differentiated.

Discussion

DR. W. F. BRAASCH, Rochester: In these cases of agranulocytosis, following the use of sulfanilamide, would you use other measures than stopping the administration of the drug? Would you use bone marrow? Would it have an immediate effect?

DR. GIFFIN: I do not know whether it is advisable to use any method of treatment in cases in which the condition is apparently due to sulfanilamide. It may be that stopping administration of the drug is sufficient.

DR. C. B. WRIGHT, Minneapolis: This is a very interesting paper because of the number of cases re-

*Yellow bone-marrow extract, 3 1/4 grain capsules, Frederick Stearns and Company, Detroit, Michigan.

ported and the length of time they have been followed. In fact, it is the largest series that I can recall seeing reported in the experience of any one man. We are recognizing more of these cases. It is true the final illness is usually very acute and tragic. We are learning more and more that these patients may have had previous attacks from which they recovered. I recently saw such a case. Her death was sudden, with high fever, normal red blood count, and a rapid disappearance of granulocytes from the blood. Transfusion did not help. Injections of blood did not help. On reviewing a previous hospitalization a year before when the patient was in for an abscess, the blood count showed that she had a marked drop in both the number of white cells and more marked still in the number of granulocytes. She promptly recovered from this attack but the last count recorded did not show a complete return to normal. In the four or five cases of this disease I have seen in practice, various procedures were tried such as pentnucleotide and transfusions. As far as could be determined, these measures had no effect on the disease. Dr. Giffin's high percentage of recoveries with the use of bone-marrow extract certainly is encouraging. As Dr. Giffin says, the cause of this condition is still undetermined. There must be something more fundamental than a mere drug reaction. Whether or not a drug reaction is an allergic reaction is not entirely agreed upon by dermatologists. Recent reports of sulfanilamide would indicate that the condition disappears rapidly with the removal of the drug. Undoubtedly, many cases recover spontaneously from attacks. With his record of recoveries from the use of yellow bone marrow, Dr. Giffin certainly should continue its use and it is hoped that some more concentrated extract may be obtained. I would like to ask Dr. Giffin if there was any way of determining in any given attack whether the outcome would or would not be fatal?

DR. MOSES BARRON, Minneapolis: Dr. Giffin was the first one to get me interested in yellow bone marrow for the treatment of agranulocytosis. It is very difficult to evaluate any kind of therapeutic measure in the treatment of this disease. The first case presented by Dr. Giffin was that of a pregnant woman who received bone marrow after the sixth day and recovered. The serious feature of this disease is that the patients may die from the second to the fifth or sixth day of this disease and if they live longer than that, many recover without any special treatment.

As Dr. Giffin emphasized, most of us do not wish to determine the efficiency of any special therapeutic agent and, for my own part, I give pentnucleotide, yellow bone marrow and liver extract all at the same time, as soon as I arrive at the diagnosis. The pathogenesis of the disease is still not understood. As Dr. Giffin pointed out, there should be no anemia along with the leukopenia for the correct diagnosis. If there is also a marked anemia present, then we must rule out other conditions such as acute leukemias and aplastic anemias.

One difficulty in the use of bone marrow is that the patients have such sore throats and find it difficult to swallow the large bulk of bone marrow necessary.

Cases in which the leukocyte count is under 300 or 400 are very serious and a large percentage die no matter what the treatment. Transfusions and x-ray treatment for stimulation of the bone marrow are practically of no value. So far, we have nothing better than the measures mentioned.

Amidopyrine may have some etiological relationship in some cases and it is not the size of the dose given but, apparently, the patient's sensitiveness to the drug which results in the leukopenia.

Prontylin has been reported to produce agranulocytosis. The nucleus in the chemical structure of pronty-

lin is similar to that of amidopyrine. Personally, I use amidopyrine a great deal and have thus far not seen a single case of agranulocytosis develop from it. At the meeting of the Central Society for Clinical Research in Chicago, three years ago, the relationship of amidopyrine to agranulocytosis was emphasized and Dr. Watkins of Rochester cited cases where the blood condition was cleared up after withholding the drug and reappeared upon administering it again. Bone marrow, along with other measures, should be used in the treatment of agranulocytosis.

DR. ALFRED HOFF, St. Paul: There are many papers about the effects of drugs, such as the barbiturates and amidopyrine, upon the bone marrow. I have had the misfortune in my own practice to have had four cases of agranulocytosis; three cases followed the use of allonal. I would like to emphasize what both Dr. Barron and Dr. Giffin said about the diagnosis. We see so much of leukopenia and we immediately begin to think what it means. Unless we have a very definite conception of what leukopenia signifies, we are in difficulty. I recall one patient at Ancker Hospital who showed various blood counts over a period of years. First she had a thyroidectomy. Her next operation was a gallbladder, and later she had backache, which was supposed to be due to some ureteral kink, and the kidney was operated upon. The patient finally came in with marked sore throat and a marked anemia and profound leukopenia. She had been given salvarsan for a Vincent's infection. Just before she died, a few immature cells were found. Autopsy revealed leukemic infiltrations in the liver and kidneys. The picture of anemia is so important in cases of agranulocytosis. We must recognize that, if the patient has anemia, we probably are not dealing with agranulocytosis.

About the treatment, I have one patient who has been well for two years. She just returned from a trip to Europe and I saw her the other day and she is perfectly well. I tried pentnucleotide. I had her husband go down to the butcher shop and get all the bone marrow he could; this was given orally, also liver extract intramuscularly. She had taken allonal for three years. She has not taken any allonal for the past two years and has remained well. I think the fundamental thing of the whole problem is, that whatever the causative action may be, there is a sensitivity in the individual. When that sensitization is recognized and the offending agent that produced the leukopenia is removed, then I think the patient will get well in the chronic recurring type of case. Bone marrow is probably an excellent thing.

DR. GIFFIN (in closing): I wish to thank the gentlemen for their discussions. In answer to Dr. Wright, I have found it almost impossible to decide beforehand whether or not a patient is likely to recover. Patients who have had edema of the larynx or incipient pneumonia at the time of admission have not survived. In the series of cases reported, patients with edema of the larynx have not been able to swallow bone-marrow capsules. The two patients who died while receiving an adequate amount of bone marrow had severe complications; one had gas gangrene and the other an abdominal abscess.

The meeting adjourned.

A. G. SCHULZE, M.D.,
Secretary.

Meeting of November 10, 1937

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, November 10, 1937.

Dinner was served at 7 o'clock and the meeting called to order at 8:15 by the president, Dr. E. M. Jones.

There were fifty-two members present.

Minutes of the October meeting were read and approved.

The Secretary called attention of members presenting papers and theses to the fact that abstracts should be handed in at the time, for inclusion in the published Proceedings of the Academy.

The scientific program consisted of two papers.

SYMPTOMATOLOGY OF THE VARIOUS LEUKEMIA STATES

T. A. PEPPARD, M.D.

Minneapolis

Dr. Peppard read a paper on the above subject and illustrated it with slides and charts of cases.

Abstract

Charts showing symptoms complained of and the physical signs observed in a small group of cases of leukemia were presented.

Attention was called to the great variability of the manifestations of this disease. Complete detailed records presented in four cases illustrating these variations.

Discussion

DR. H. L. ULRICH, Minneapolis: There is an immense amount of material in this study. Dr. Peppard deserves the applause and commendation of all of us for attempting such an analysis. It is difficult to discuss the rarer forms of leukemia because of our limited experience and its protean clinical manifestations. The leukemias are a paradise for the hematologist, although he gets lost in his paradise quite often. Because of the extreme difficulty in differentiating these various leukemias, I think Dr. Peppard is to be congratulated for making this clinical and hematological study.

DR. S. E. SWEITZER, Minneapolis: This is the first time I have seen a group comprising a large number of internists who were speechless after a paper. I was extremely interested in Dr. Peppard's paper and particularly interested in the fact that he did not say much about leukemia as far as the dermatologist is concerned. I am sure he must have seen some dermatological symptoms. From our standpoint, practically all our cases present dermatological symptoms. Some have exfoliative dermatitis for a long while and finally turn into leukemia, and some have minor skin symptoms at first. Some have leukemic infiltration early and no blood symptoms. I recall a patient who had been to a clinic where they had made a diagnosis of lymphosarcoma. An operation was done on the neck and six or seven years later the patient was still alive. She came in with what looked like a syphilitic serpiginous eruption on the scalp. The Wassermann reaction was negative. Biopsy showed leukemia. The blood smear was turned over to Dr. Downey who made a tentative diagnosis of leukemia. That was last summer. She came in again recently with the same type of lesion on her back. She also complained of pain in the eyeball. Dr. Peppard mentioned this, but that was the first time that I had encountered this symptom. I gave her some x-ray over that area and she was relieved. That may have been imagination but she did get relief.

I want to emphasize the point that these patients may have lesions that would lead one to suspect leukemia and yet one can't find it when examining the blood.

DR. PEPPARD (in closing): I thought I paid my respects to the dermatologists. In this group there were four who complained of skin conditions and ten who showed skin lesions on physical examination. As a rule, no biopsy is required for diagnosis for the blood examination usually suffices. However, in occasional cases, biopsy is invaluable. Whenever anyone interests himself in any one particular finding, his investigations will commonly show a higher incidence of such conditions than are found on routine examination.

THE IMPORTANCE OF IMMOBILIZATION AND POSTURE IN THE TREATMENT OF ACUTE INFECTIONS OF THE EXTREMITIES

OWEN H. WANGENSTEEN, M.D.

University Hospital

Dr. Wangenstein read a paper on the above subject, illustrated with lantern slides demonstrating methods of treatment and results.

Abstract

The rôle of the surgeon in the management of acute infections of the extremities has been reviewed. It is pointed out that his chief objective should be to assist the natural defense mechanism of the body in overcoming or localizing the infection. Other than that, his function is that of a pus evacuator—to incise an abscess when suppuration occurs.

The great virtue of rigid immobilization and elevation of the affected member in infection is described. It should be the aim of the surgeon to keep the infected extremity as quiet as physically possible; in addition, he should, through employment of elevation, strive to keep swelling at a minimum. The attainment of these objectives serves the natural defense mechanism of the body in a most helpful manner.

Discussion

DR. A. E. BENJAMIN, Minneapolis: I was very glad, indeed, to have Dr. Wangenstein bring up this method of treating wounds, injuries, or infections. It has been my practice for a number of years, in cases of infection of the extremities, to elevate the part affected about as he has demonstrated by the cases shown here tonight. I have a few cases on hand now in which this is very well illustrated. Perhaps we may be able to obviate a great many operations by following this procedure. I would further include under this method of treatment, certain leg ulcers from varicose veins. If you put the patient in bed and elevate the leg, you will note how quickly the ulcers improve. I have practiced this method in other cases, such as pelvic inflammations without any definite abscess. Cases of endometritis and non-specific salpingitis will often get well if the foot of the bed is elevated. It has been my rule always to put an inflamed part above the normal circulatory level; the swelling then disappears around the inflamed area. If there is swelling there is not the drainage of the deeper parts that otherwise obtains; and the less swelling there is the better drainage there will be of the deeper tissues. In a case of ruptured appendix, besides instituting the

ordinary drainage treatment, the patient may be turned over on the abdomen. I recall one patient, a physician, who had an acute gangrenous appendix with abscess. I could not get the appendix out safely. I turned him over on his abdomen and the appendix sloughed out in three days. One should always put infection cases in a position which promotes drainage. They will recover faster that way.

I think the method of using casts, as Dr. Wangenstein has described, is a great help in treating certain cases.

DR. L. C. BACON, St. Paul: I listened to Dr. Wangenstein's talk with a great deal of pleasure. I am glad to hear him bring up old principles. They cannot be emphasized too much. It recalled my student days under de Nancrede. He taught that, in case of inflammation, rest and elevation of the part is the first thing to be done. It became monotonous to the students but it was repeated until it became a part of our daily lives.

DR. J. FRANK CORBETT, Minneapolis: Dr. Wangenstein has given us a good deal of food for thought. I have lived long enough to see treatment of osteomyelitis progress. In the early days, wounds in the bones were opened, dressed every day, and then almost never got well. Then Orr advanced his method of treatment—complete immobilization in plaster casts, packing of the cleaned out area with vaseline and no dressing for a long time. That was a distinct advance. And now we come to another thought in regard to these cases. I recall the experience we had on the Mexican border in 1916. There were a good many gunshot wounds. That was a sterile, hot country where there was not much infection, but there were many compound fractures from gunshot wounds. Those healed very nicely without an antiseptic other than surface disinfection, but they were immobilized in plaster casts. Later on, in the World War, it was my lot to do a great number of reconstructive operations. In wounds thought to be quiescent, infections did not occur following operation; I attributed it very largely to the fact that every one of these extremities was extensively encased in plaster, and there was absolute physiologic and complete rest to the body. However, infections vary. Every war has brought in its train a terrifically dangerous infection, and the infections of the last World War were severe in character and demanded radical treatment. We seem now to be one of the cycles of comparatively mild infection of wounds and the radical treatment of war days is no longer used.

Dr. Wangenstein's paper was very well presented.

DR. H. P. RITCHIE, St. Paul: I protest the use of Bier's hyperæmia treatment. Whatever the rationale, no cognizance is taken of the comfort of the patient. I was once subjected to this plan and testify that the method is barbarous.

I shall await, with great interest, the follow-up report on the treatment of burns by Dr. Wangenstein's plan for the fixation rest of the affected parts.

DR. C. C. CHATTERTON, St. Paul: I heartily agree with Dr. Wangenstein in regard to rest and protection of parts affected with acute infection. Immobilization gives a patient comfort and prevents deformity. Until recently we were of the opinion that our treatment of osteomyelitis, so far as the end result is concerned, was perhaps superior to the treatment given years ago. In going over the records of the Gillette Hospital for Minnesota's crippled children, we find that the records of 30 or 40 years ago compare very favorably to the present records as to time in the hospital and time for the sinus to heal.

DR. A. R. COLVIN, St. Paul: The treatment of infections is perhaps the largest field of surgical endeavor and Dr. Wangenstein's paper has covered many aspects of it. His theme of "Rest in Pain" must be appreciated by all.

There is one thought concerning infections which should influence greatly our approach to the diagnosis, prognosis and treatment of infections; and that is the variability in virulence of the infecting agent and the very reliable reaction of individual tissues to infection; and, of course, our appraisal of the value of therapeutic measures—surgical or otherwise—must be influenced by an acknowledgement of these facts.

May I cite a few cases seemingly to confirm these inferences? A man of about 40 years (1908), with a suppurating tendon sheath opened on recognition, a few days later developed an abscess in the calf muscles of one leg and still a few days later developed an abscess in the other calf muscles. These were opened as soon as recognized; and very shortly there developed an acute non-suppurating infection of a shoulder and hip joint. Apparently there was no effusion, the joints were not opened, and recovery took place with saving of the tendon involved. Both joints recovered but had limited movement for some time. The closest observation was necessary to interpret the nature of the joint lesions—immediate opening saved the tendon. There, then, were different reactions of tissues at the same time in the same organism from the same infection.

The manifold nature of osteomyelitis is strikingly apparent. The infection may be fatal before there is time to do anything about it. At the other extreme is a small area of bone involvement, the size of a grain of wheat, which, as proven by radiographic study extending over a year, was entirely recovered from without any kind of treatment. There may be involvement of several bones, each bone presenting a different amount of invasion and a different grade of inflammatory reaction.

A girl of five years (1907), had five bones involved. The femur was involved in the lower third; at no time was there any operative surgery, the bone draining into the tissues of the thigh and thence through the skin. Radiographs taken at intervals showed the destruction and regeneration until at the end of a year the femur looked almost normal and remains so at the end of 30 years. The ulna showed a slow-going destruction and repair with the formation of a new shaft in the center of which were remnants of the old shaft as sequestra which had to be removed. In the humerus there was a small area about 1 cm. in length. Another child, with all the long bones of both extremities infected, presented with a very acute osteomyelitis of the femur which was opened at once. The child was very ill and, although relieved of pain, the entire femur became involved. While lying in bed, bone after bone became involved and one was conscious of this only when abscess after abscess was manifest and required opening in the various extremities. Except for the femur, first involved, the bones were not operated upon. There were no two lesions quite alike in extent of involvement. And it would seem that, as well as variability in virulence, there is a great variability also in the amount of bone involved. This, I believe to be explained by the extent of vascular territory involved by the embolic invasion; and, too, this is, as it were, at one assault.

A boy of six years was seen six weeks after the onset of trouble, in the meantime having been treated for arthritis of the knee. His physician was insistent that the femur be opened and, although pain and fever were receding, a small opening was made in the femur. There was no pus, the spongy bone was strikingly red, the small wound in the soft parts was partially closed

and finally closed completely. It was only after two months that an abscess in the soft parts was opened and in four months a sequestrum was removed.

A girl of fourteen with extreme pain and temperature of 101° to 104° lasting four months, presented herself with pain and swelling in the knee joint. The pain and elevated temperature suddenly subsided though no surgery had been done. Finally, a small abscess of the thigh opened spontaneously and ultimately a sequestrum was removed.

A boy fourteen, with multiple acute arthritis for 10 weeks and marked elevation of temperature, was reported by his physician who had at first very excusably diagnosed the case acute rheumatism. At the end of ten weeks all the joints except the hip and knee on one side were well. At that time the thigh was much swollen, there was very little pain, and the temperature was 101°. No operative measures were undertaken. He was observed for five years, during which time no abscess had as yet developed, and at this time a central sequestrum was removed.

Effusion in a joint contiguous to osteomyelitis rarely requires removal; usually it will be absorbed. The same variability as that in osteomyelitis is seen in joint infection and the treatment is just as variable. Numerous microorganisms may cause an arthritis varying from serous, fibrinous, purulent and phlegmonous. At times it is more important to know what the microorganism is doing rather than the name of it. And the treatment must be as varied as the process is variable. I am reminded of the visit of Ambroise Paré to the country to see a young man who was very ill. He said he found the young man in a most deplorable condition, lying in a filthy bed bathed in pus. He thought he could do nothing for the young man but, after taking a walk in the fields, he returned and ordered the patient bathed and supplied with clean sheets, and his thigh to be dressed with an infusion of fragrant herbs. He says that he had the pleasure of hearing that the young man recovered. I have often wondered if that case was one of neglected acute suppurative osteomyelitis. For pain, rest in bed is also valuable. Rest in a cast is of undoubted value and so is rest for the olfactory of the patient, surgeon and nurses—meaning sufficient change of dressing to accomplish this.

The treatment of chronic osteomyelitis is as variable as the result produced by the acute infection.

Just a few days ago I saw a patient on whom I operated thirty-two years ago for osteomyelitis of the lower end of the femur. He is now suffering from a very acute recrudescence of his former infection—after an interval of thirty-two years. After a few days of regrettable procrastination, a large amount of pus was evacuated from a cavity in the lower end of the bone. He will very likely never be completely cured of his trouble.

It is quite pertinent to ask when infection of bone is cured; and it is sad to say that a very large number are never cured. Microorganisms have become encapsulated in small areas of granulation tissue or in the lacunæ and canaliculi and Haversian canals of the cancellous bone which are rarely all reached by any kind of operative attack. Recurring fever and pain usually demand liberation of pus, all the more so because, in these recurring chronic cases, the pus is confined by thick-walled more or less sclerotic bone and the pain is very severe. One might say, in closing, that relief of tension by incision not only relieves pain but, in properly selected cases, leads to a subsidence of the inflammatory process.

DR. WANGENSTEEN (in closing): With the development of antiseptics and asepsis the scope of the surgeon's activity broadened considerably. His ac-

tivity formerly had been concerned largely with the management of wounds. Despite his present greater field of interest, one of his major concerns is still the management of wounds. It is, therefore, very refreshing to note the manifest great interest in a subject that has perplexed surgeons ever since the humblest beginnings of their craft.

The vagaries of infection to which so many of the speakers alluded, are matters with which every one is familiar. We have all had ample opportunity to note how the mortality of pneumonia, empyema and other infections has varied from year to year independent of the mode of treatment employed. Obviously, therefore, it is an item to be reckoned with in evaluating the results of any scheme of treatment.

It is important that surgeons review critically the remedial measures which they employ in the treatment of infection. It is so easy to continue indefinitely with therapeutic agents which have not proved their worth. Surgeons generally have come to recognize their own great shortcomings in dealing with spreading infections. We no longer see surgeons making incisions in phlegmonous inflammations in the hope that they can thereby localize the infection. They have come to know that only the natural defense mechanism of the body can do that. All the surgeon can do, apart from assisting the body in its conflict with infection, is to evacuate an abscess when localization of the infection and suppuration have occurred.

I have had no experience with the conservative means of management here described in impalement types of injury which result in rapidly spreading infection and bacteremia. Instances are known to all of us in which extremities have been uselessly sacrificed in the hope of stopping the centripetal spread of the infection. The experiments of Schimmelbusch (1894) with tetanus toxin and the rat's tail are undoubtedly known to most of you. He observed that, if the denuded rat's tail was immersed in a culture of tetanus toxin, when more than 10 minutes elapsed it was futile to cut the rat's tail off at the base. The toxin had already penetrated beyond. I am inclined to believe that the interests of patients who suffer impalement types of injury giving rise to virulent infections, are better served by conservative means. Friedrich (1898) was able to show that the immediate application of antiseptics and employment of excision to tissue did exert an important influence when applied early in experimental infections in which dirt had been rubbed into wounds. After the lapse of six hours, the employment of such expedients was without value. His experiments constitute the basis of the modern débridement of soiled wounds.

The great value of immobilization and elevation in the treatment of pyogenic infections of the soft parts can be appraised now. He who will give the method a trial will observe that pain will decrease and that swelling lessens. The necessity for incision for the evacuation of exudate is less than with employment of hot fomentations with the extremity upon the bed slightly below the level of the heart. The results of treatment of acute hematogenous osteomyelitis in the manner described above must await the lapse of a sufficient interval of time. It has been intimated that the satisfactory results attending conservative treatment of acute osteomyelitis may have their explanation in rather benign forms of the disease. I value that suggestion, for an observer must always be on the alert lest he deceive himself. Yet, I would again say that many of these patients with osteomyelitis herein referred to were very ill. During the same period we have seen a few patients who had their trepanation before they came to us. The early effects, i.e., healing of the wound and subsidence of the inflammatory

(Continued on page 78)

TRANSACTIONS of the MINNEAPOLIS SURGICAL SOCIETY

Meeting of November 4, 1937

The stated meeting of the Minneapolis Surgical Society was held Thursday, November 4, 1937, the president, Dr. O. W. Yoerg, in the chair.

The following papers were presented:

CARCINOMA OF THE GALLBLADDER WITH IMPLANTATION IN THE ABDOMINAL WALL

Case Report

JAMES A. JOHNSON, M.D.

MRS. D. W., aged seventy-three, was admitted to the Eitel Hospital October 7, 1936. Her previous history was negative except that she had a gallbladder drainage ten years ago, at which time stones were removed. She had been well until August 15, 1936, when she had an attack of vomiting which she attributed to a dietary indiscretion. On September 1, she had another attack of nausea and vomiting. There was no pain with either of these attacks. Two days after the last attack her daughter noticed that her eyes and skin were yellow. The jaundice gradually became more pronounced and she had intense itching all over the body. Her appetite had been poor and she had lost 8 pounds in weight. She consulted her family physician, Dr. S. Ericson of Le Sueur, Minnesota, who referred her for examination and also thought from his observation that there was a possibility of stone in the common duct.

Examination revealed a poorly nourished, viscer-optic, feeble old lady. The abdomen was moderately distended. The liver was smooth and extended three fingers below the right costal margin. She was deeply jaundiced. The urine was loaded with bile pigments. Exploratory operation was advised.

At operation October 9, 1936, the gallbladder and duodenum were found buried under omental adhesions. Four large stones were removed from the common duct and three stones from the right hepatic duct. The gallbladder was opened, no stones were seen, and the mucosa looked normal. The pancreas did not feel hard. The stomach and duodenum were normal. The liver was engorged with bile. A T-tube was placed in the common duct and the gallbladder was drained. Because of the extreme enlargement of the liver both drains were brought through the lower angle of the wound just inside the iliac crest.

The postoperative course was uneventful. The jaundice promptly disappeared, the liver receded to its normal size, she ate well and gained her normal weight, and continued in good health until the middle of July, 1937, when she began to have gastric distress with occasional vomiting. This increased until she was unable to retain any food. She was again admitted to the Eitel Hospital August 18, 1937. A barium meal demonstrated an obstruction at the second portion of the duodenum. At the lower angle of the scar—the site of the previous drainage—there was a hard nodule about 3 cm. in diameter.

At operation August 21, 1937, incisions were made through the old scar, and the nodule was removed separately. It was hard and on cross-section looked like a carcinoma—resembling a scirrhous carcinoma of the breast. It was confined to the tissues of the abdominal wall and did not invade the peritoneum. A microscopic examination was requested. On opening the abdomen the duodenum and omentum were firmly

fixed underneath the liver, as if there had been a perforation. When the duodenum was separated, a necrotic perforation was present which was sutured with dulox catgut, and a posterior gastroenterostomy was done. The gallbladder and pancreas could not be visualized or palpated because of the large inflammatory mass which was thought to be due to the perforation. Following operation a microscopic section of the nodule by Dr. Koucky showed a fibrous tissue stroma within which were imbedded malignant carcinoma cells. Evidently the malignant cells had been carried through the drainage tube and grown by implantation in the abdominal wall.

After the operation she developed leakage from the duodenum, which resulted in peritonitis, and death occurred on the seventh day.

Postmortem.—The gallbladder was completely replaced by a white tumor mass. There was a metastatic mass on the posterior surface of the right lobe of the liver near the vena cava. The lower end of the common duct, head of pancreas, pylorus and duodenum were imbedded in a solid mass of fibrous tissue. There were small seed-like implants along the root of the mesentery and posterior abdominal wall. Microscopic examination showed primary carcinoma of the gallbladder with metastases to the liver and peritoneum. The pancreas was free.

There was a bilateral terminal bronchopneumonia.

Comment.—The extension of carcinoma from its primary focus is usually by the lymph vessels or by direct extension. A less common, but nevertheless definite, method is by direct implantation of the cancer cells at sites distant to the original tumor. In this case the cancer cells evidently were carried directly through the drainage tube into the abdominal wall, where they began to grow and formed a separate distinct tumor. There are several well-known examples in which carcinoma spreads by implantation. It is common, for instance, when a carcinoma is present in the stomach to find implant growths deep down in the pelvis. Likewise, in primary carcinoma of the ovary, it is common to find it spread uniformly throughout the abdomen in the form of miliary nodules. The cells evidently spread through the peritoneal fluid; occasionally also into the abdominal scar. It is uncommon, however, to find so striking a case as the above, where the carcinoma cell has implanted itself in entirely a different tissue at a remote distance from the original lesion. This brings us to the importance of such a clinical finding. It seems to me that it is evident that a surgeon must be careful when operating upon cancer not to invade the growth or glands in such a way that the loose implants are scattered in the healthy tissue. This is especially important for example when doing a biopsy on the breast. Here the tissue should be widely excised and gloves and instruments discarded before proceeding with the radical operation. It is also important in removing the involved glands not to macerate them and infect surrounding tissues.

My purpose in reporting this case is to stimulate an

interest in clinical evidence of cancer implants and the benefit we may derive from it. I hope members of this Society will be looking for similar cases and report them to us.

Discussion

DR. GEORGE D. EITEL: Statistics indicate that 5 to 7 per cent of all carcinomas found at necropsy originate in the gallbladder. There is also a definite association with gallstones, and different reports indicate their presence in from 65 to 90 per cent of cases. It is more common in females and usually occurs between the ages of fifty and sixty. Walters, in 1936, reported thirteen malignant gallbladders in 808 cholecystectomies while Judd, in 1931, reported twenty-two cases in 879 cholecystectomies.

The diagnosis is usually not made except in advanced cases when the patient is very ill, usually jaundiced and presents a palpable tumor. In the earlier stages of the disease the diagnosis is usually a non-functioning gallbladder with or without stones. Because the lesion usually originates in the cystic neck of the gallbladder, there is always an obstruction to the entrance of the gallbladder and x rays fail to depict the lumen of the gallbladder.

Kirklín reports sixteen cases of carcinoma of the gallbladder in which cholecystography preceded the operation, and it was found that in fourteen cases no shadow of the gallbladder appeared although gallstones were present in seven. In one case function was present but multiple stones were present and in one the shadow was normal.

The gross pathology is usually an irregular carcinomatous mass involving the wall with a stone or multiple stones in the center—probably the source of the original irritation. Perforation of a carcinomatous gallbladder rarely occurs, but when it does, secondary growths occur causing ascites or a fistulous opening between the gallbladder and a hollow viscus.

The common mode of extension is to the adjacent liver either directly or through the blood vessels or to the lymphatic glands lying in the hepatic fissure.

At operation those readily recognized as malignant are usually irremovable. Death is usually caused by hepatic insufficiency, or if removal or even biopsy is done, death may result from an associated severe hemorrhage.

The permanent cures of carcinoma of the gallbladder are usually those in which the gallbladder is removed for a chronic condition and the routine laboratory microscopic examination of the gallbladder disclosed malignancy.

The microscopic pathology is usually adenocarcinoma, although in a series of thirty-three cases careful studies revealed the presence of squamous cell carcinoma in three cases. Kaufman reports a case of sarcoma and states that only thirteen cases are on record.

DR. KENNETH BULKLEY: Might I ask the reader or his discussor as to the radio-sensitivity of these recurrences?

DR. JAMES A. JOHNSON: Dr. Bulkley asks about the sensitivity of carcinoma of the gallbladder to x-ray treatment. I am unable to answer this question directly since our experience with carcinoma of the gallbladder is rather limited. I would say in a general way, however, that it would react unfavorably because as a rule this is true of carcinoma of any of the abdominal organs.

I want again to summarize the important finding in the case just reported. At the time I first operated upon this woman, removing the stones from the com-

mon and hepatic ducts and draining the gallbladder, I was unable to find any evidence of carcinoma. She was entirely well for about one year, when she returned with an obstruction of the second part of the duodenum. The main finding, however, was a nodule which was present in the abdominal wall and was confined to the skin, fat, fascia and muscular tissues, and did not involve the peritoneum. Since it would be impossible for this to be transmitted through the blood or lymph channels, it is certain that this could only arrive through a direct transplant. The primary carcinoma was in the gallbladder and the carcinoma cells evidently drained through the drainage tube directly into the abdominal wall where they began to grow. I believe this is a significant finding.

DIVERTICULUM OF THE ESOPHAGUS

A. A. ZIEROLD, M.D.

SOMETHING over a year ago this man was sent to me complaining of gurgling and a fullness in his neck and regurgitation of food. These symptoms had persisted over a period of ten to fifteen years, increasing to a point where he was having definite distress. The regurgitation was becoming not only embarrassing but was interfering with eating. X-ray examination revealed an esophageal diverticulum which, peculiarly enough, was in the midline. These pulsion diverticula (this discussion will be confined entirely to pulsion diverticula), are herniations of the mucosa and submucosa through the musculature at the junction of the lower portion of the pharynx and the beginning of the esophagus, forming a sac which descends usually on the left side of the neck, increasing in size, so that the esophagus is deflected to one side, making the esophagoscopy or the passage of a Bougie dangerous.

In the past, any treatment directed toward the correction of this has been attended by considerable danger because of the difficulty of removing, ligating, or suturing such a wide mouthed sac and preventing leakage into the mediastinum. The diverticulum passes downward between the prevertebral and pretracheal fascia and affords direct access to the mediastinum and any leakage is very promptly followed by a mediastinitis. In the past, attempts were made to excise the sac, exposing the sac and suturing it. The major danger was, of course, the leakage and the mediastinitis which followed. The second complication which often followed was a constriction of the esophagus. This state of affairs continued until such time as the two-stage operation was devised in which a preliminary operation for the exposure of the sac was performed. The sac was identified, dissected free and the mediastinum was walled off by adhesions between the fascial planes. At a later date an attempt was then made to tie off or suture the sac. This, while an improvement, was not entirely successful.

I am presenting this patient to you this evening to illustrate how a formidable procedure can be made easy. Dr. Lahey, I believe in 1930 or 1931, devised a method which is as near fool-proof as any and is the best example of surgical ingenuity and clear thinking

that I know of. I don't know when I have seen or when I have done anything that has given me so much pleasure as Dr. Lahey's technic for the cure of esophageal diverticula. Dr. Lahey advises a longitudinal incision along the sternomastoid, retracting the sternomastoid together with the carotid sheath and the large vessels. Then, by ligating the lateral thyroid veins and the inferior thyroid vessels, direct exposure is afforded of the esophagus and of the diverticulum which, of course, begins at this point and extends downward. It is surprising what a bloodless field and what a really accessible field can be obtained with so little dissection. When this is done, the sac is carefully dissected free, remembering, of course, that it is only submucosa and mucosa. Care is taken to free the attachments at the lower angle and to reverse the angle of the sac, bringing it up to an obtuse angle and suturing the sac to the skin. That is all that is done at this operation. Care is taken, of course, to dissect well around to the right side to free any adhesions occurring on the opposite side. The fundus is sutured to the skin edge and is allowed to remain there, as in this case, eight days.

At the end of that time the end of the fundus is cut off level with the fascia and the mucosa which lines the diverticulum is separated from the submucosa as far as the esophagus. It is then cut off at a point one inch from the neck of the sac and folded upon itself. This tube of submucosa is loosely filled with some vaseline gauze. The mucosa very promptly retracts and contracts until it eventually gives a smooth lining to the esophagus. The submucosal tube becomes obliterated and at no time is there an opening or communication between the esophagus and the wound. At no time is there an opportunity of leakage into the mediastinum. In this instance, happily, there was no drainage after the second operation, no regurgitation of food and no fluid discharge through the sinus. At the end of another ten days the patient was discharged. He has had an uneventful convalescence and I present him to you this evening to show you that the residual submucosa causes no contraction deformity of the scar in the neck. It is freely movable in all directions. The patient has been symptom-free up to the present time. The only thing we haven't done is to dilate him postoperatively. Dr. Lahey advises the routine dilation of the esophagus on the assumption that the initiation of the diverticulum is due to a spasm of the beginning of the esophagus. In this instance the patient apparently successfully survived the interval and I see no reason why he should not continue.

Discussion

DR. ORWOOD J. CAMPBELL: I envy Dr. Zierold for the pleasure he must have had in caring for this patient. My own experience with the surgical treatment of diverticula of the esophagus has been very limited but the few operations for diverticula which I have done have been fun and I have enjoyed doing them.

Dr. Lahey has described an ingenious operation the principal advantage of which is that it provides a

tube whereby any leakage from the esophagus is transported to the outside and not permitted to escape into the fascia layers thus to produce a mediastinitis. In some of these sacs I should anticipate considerable difficulty in shelling out the mucous membrane because of inflammation and adhesions. In such a case it would be a simple matter to do the classical two-stage resection removing the entire sac.

The principal controversy today among those who see many of these cases seems to be whether the operation shall be done in one or two stages. Dr. Jackson and his associates advocate the one stage procedure, using the esophagoscope as an aid.

The esophagoscope is passed into the diverticulum and its contents aspirated. A strong light on the end of the esophagoscope then transilluminates the sac and makes it easy for the operating surgeon to locate, free and deliver the sac into the wound. The sac is then excised and with the esophagoscope passed on down toward the stomach primary suture is done.

My limited experience does not warrant my advocating one or the other method. Personally, I like the added protection of the two-stage operation. Especially is this true if the sac is large. Smaller diverticula may be closed primarily.

Dr. Zierold mentioned narrowing of the esophagus as a complication of the usual two-stage resection. Judd, in reporting his experience with 171 operated cases, did note a small percentage of narrowing of the esophagus but stated it had not been a serious difficulty. They do not make a practice of dilating the esophagus except when indicated.

I believe the use of the esophagoscope even in the two-stage operation of resection has definite advantages. It will assist the surgeon in locating the sac and at the second stage, can be passed on down toward the stomach to prevent narrowing of the lumen when the neck of the sac is sutured. If this precaution is observed I believe a troublesome narrowing at the point of suture can be avoided.

DR. S. R. MAXEINER: In our service at the Veterans' Hospital we have had two cases of esophageal diverticula in the last two years. Upon the first patient we performed the two-stage procedure, bringing the sac into the elevated position along the pharynx at the first stage and ten days later resected the sac. The neck of the sac was tucked beneath the muscle planes which were closed tightly. In this case healing progressed without infection and with a perfectly normal convalescence.

The second case was operated upon by Dr. Sedgely and myself by one-stage technic which I suggested and which I have not seen described any place in the literature.

Technic.—A customary incision was made along the anterior border of the left sterno-mastoid muscle. The inferior thyroid artery was ligated and the muscles and the vessels retracted laterally and the thyroid retracted medially. The sac, which was of good size, was dissected free until the pedicle was well exposed, the muscle planes were separated well back from the mucosa and a small curved forceps was placed across the pedicle close to the lateral wall of the esophagus. A second forceps was placed across the pedicle of the sac parallel to and a short distance from the first pair of forceps. The pedicle was divided between the forceps with a cautery knife and the second forceps together with the diverticulum was removed. The muscle planes were then carefully sutured over the forceps which was clamped to the cut-off end of the pedicle so that all of the forceps containing pedicle was completely buried by the overlapping muscle planes. The wound was then loosely closed around the forceps, which was left in situ to act as a drain. On the seventh day the forceps became spontaneously

detached and fell out. There was a very small leak of a few drops of clear fluid which drained out of the sinus established by the forceps for approximately a week. The wound healed uneventfully and the patient made a splendid recovery.

The object of the two-stage operation is primarily to prevent mediastinal infection. We believe that the forceps establishes a definite sinus with the walling off of the fascial planes before the forceps separated and a leak occurs as was proven in this case. We feel that this technic in this one case proved to be entirely satisfactory and efficient and is certainly deserving of further trial.

DR. JAMES A. JOHNSON: It has been very interesting to listen to Dr. Zierold's report of removal of this esophageal diverticulum. It has been my custom to remove these diverticula in two stages, and following the second stage I have been in the habit of putting in a nasal tube for feeding purposes and to also obviate any possibility of vomiting for a few days until healing has taken place. I would like to ask Dr. Zierold what his postoperative care was in this particular case.

DR. A. A. ZIEROLD: I did not restrict him at all. He went on a general diet forty-eight hours after the resection.

ENDOMETRIOSIS

WILLIAM R. JONES, M. D.

ENDOMETRIOSIS is the presence of endometrium outside of the uterine cavity. Its cause is not definitely known. However, there are several theories as to its origin. Those most widely recognized are: (1) the implantation one of Sampson, who believes that endometrial tissue finds its way through the fallopian tubes into the abdominal cavity where it implants itself and grows; (2) the embryonic rest theory advocated by Cullen and others. These men believe that the embryonic rests are activated during active menstrual life and give rise to symptoms.

Endometrial growths are found in the abdomen and pelvis from the umbilicus downward. Most frequent locations are the uterus, fallopian tubes, ovaries and the recto-genital space. Less frequently they are found in the rectum, intestines, sigmoid, appendix, vagina, uterine ligaments, umbilicus and abdominal scars following operations on the uterus.

The essential pathology is a menstruating endometrium within a closed sac and the complications of this process. The growth may vary from the size of a millet seed to a mass as large as a six months' pregnancy. As the mass enlarges it tends to infiltrate the host tissue. No definite line of cleavage is present. When the ovary is involved the cyst may rupture and a dark chocolate colored material escapes into the abdominal cavity. This material is highly irritating and stimulates dense adhesions between tissues that it contacts. These adhesions are very difficult to separate as they are infiltrative in type.

Microscopically the growth resembles endometrium very closely. Endometriosis usually occurs between thirty years of age and the menopause. According to

Sampson, it is present in from 10 to 20 per cent of women. The outstanding symptom is dysmenorrhea of the acquired type. Usually the first symptom is severe abdominal pain at the menstrual time which is most frequently lower abdominal, but may be upper abdominal or over the entire abdomen. The pain will last throughout the menstrual period, differing from that of cervical stenosis, which usually decreases after the flow has started. There may be some constant abdominal pain, but it is much more pronounced at the menstrual time. Nausea and vomiting may occur, suggesting acute appendicitis. If a chocolate cyst ruptures into the abdominal cavity, there will be signs of peritoneal irritation, nausea, vomiting and boardlike abdominal rigidity and increased leukocyte count. If the growth encroaches on the bowel, there may be symptoms of intestinal obstruction. If on the vagina or rectum, coitus may be painful or impossible and there may be pain during the act of defecation.

The treatment is surgical exploration and removal of the growth with conservation of the ovaries, if possible, in young women. In older women, both ovaries should be removed as this stops the progress of the disease and also causes a regression. For the recurrent cases and irremovable growths, sterilization by x-ray or radium is a treatment of choice.

Case 1.—The first case is that of a woman twenty-nine years of age. This patient was admitted to the Eitel hospital, January 9, 1937. She complained of severe lower right abdominal pain. There was no nausea or vomiting but the patient had lost her appetite. Her past and family histories were negative. Examination revealed an obese young woman, evidently suffering severe pain in the abdomen. There was marked tenderness and rigidity in her right lower abdomen.

Pelvic examination was negative, except tenderness on palpation. The white blood count was 16,000; polymorphonuclears 80 per cent. The urine was negative. A diagnosis of acute appendicitis was made.

Exploration of the abdomen revealed a leaking chocolate cyst of the right ovary. The entire ovary seemed to be involved and therefore was removed. The left ovary appeared to be normal. The patient had an uneventful recovery and seemed to be well for four months. Then she began having pain with each menstrual period. The past three periods have been so painful that morphine was required for relief. This patient has been advised to have x-ray treatment.

Case 2.—The second case is that of a nurse thirty years of age. The family history was negative. She had been treated for kidney stones in 1927. Her appendix was removed several years ago. She was seen by me at her home November 29, 1929, because of severe abdominal pain which began after her menstrual period started. The pain was followed by nausea and vomiting.

The patient stated that she had a similar attack in June, 1929. Severe abdominal pain was present, which appeared on the third day of her menstrual period. Her temperature at that time was 103° and leukocyte count was 16,000. She was confined to the hospital for five days. Her physician made a diagnosis of peritonitis. The July and August menses were normal. However, in September, on the third day after she began to flow, severe generalized abdominal pain again oc-

cured, which lasted until she stopped flowing. In October she experienced the same difficulty.

Examination, November 29, 1929, showed a well developed young woman evidently suffering severe pain. Her abdomen was very tender and rigid. Pelvic examination caused pain, but no abnormal pelvic masses could be palpated. The patient was taken to the Eitel hospital and a consultation was held with a gynecologist and urologist. Under ether and anesthesia, pelvic examination revealed a mass in the right adnexal region. Exploration was advised and was done.

When the abdomen was opened a cyst of the right ovary, the size of a small orange, was found, from which dark chocolate colored material was leaking. There was an unruptured cyst of the left ovary the size of a hen's egg. Because of the patients age, a conservative operation was decided upon. The cysts of both ovaries were removed and the ovaries reconstructed. There was nothing unusual about her convalescence. Four years later she married and moved to another city and has not been heard from since. For these four years she was free of symptoms.

Discussion

DR. RICHARD R. CRANMER: To me, endometriosis is a very unusual and peculiar condition. It has some of the earmarks of malignancy but still it is not a malignancy. The man who made a comprehensive study of endometriosis first was Sampson in 1921 and he advanced certain theories as to its etiology. He outlined, or rather, classified the different types according to the method that the endometrium reaches its ectopic positions. His first classification is that of primary endometriosis, where the endometrial cells misplaced in the uterine body develop that condition commonly known as adenomyoma and which penetrate the entire thickness of the uterine wall. Sometimes these adenomyomata, that are of mucous origin and definitely secondary to an extension process of the endometrium, are found out underneath the peritoneum, indicating that they can travel. The second classification is the implantation classification in which the endometrium is forced out of the uterine cavity through the tubes and into the peritoneal cavity and there it becomes an implant and develops and grows. Not only is it activated by the hormones just as the endometrium of the uterine cavity is, but after it has reached its location it develops and grows in size just as a malignancy does. That is the common type of endometriosis, the kind that we see most of, and it is that type that produces the so-called chocolate cyst of the ovary. The third classification is where the endometrium is transplanted into new locations due to operation. Sometimes it develops in the abdominal wound and sometimes in the perineal wound. A fourth classification, according to Sampson, is where the endometrium cells do have a metastatic action and cause metastasis into other areas in the pelvis, not in the peritoneum but in the subperitoneal areas.

Sampson also admits the possibility of endometriosis being due, in some instances, to misplaced endometrial tissue in the Wolffian body. He said he had never had any cases that he thought developed in that way but he admits the possibility of it.

As far as the treatment is concerned, Dr. Jones has covered that; the prophylactic treatment is to prevent those things which cause an expression of the endometrial cells through the tube and then into the peritoneal cavity. Sampson thinks that the inflation test of Rubin for determining the patency of the tubes should not be done soon after menstruation. He recites a case where some of the implants developed following such a procedure. Curettage soon after menstruation is also advised against.

As far as the operative treatment is concerned, he

thinks that if it is a young woman with a single ovary involved, the ovary should be removed but not the other ovary. If it is a widespread process the best thing to do is double oophorectomy and possibly a panhysterectomy. Then, if all the implants cannot be removed, radio therapy should be used. However, there is an argument against the use of the x-ray because usually in this condition there are a lot of adhesions and the x-ray increases adhesions and might increase the symptoms resulting from them. There are very interesting cases reported. Dr. Ikeda, St. Paul, reported a case the other night. The patient was being operated on for suspected appendicitis and the patient had, implanted on the appendix, a section of endometrial tissue which evidently was the cause of the trouble. Dr. Gingold reported a case where the body of the uterus was involved and multiple implants were on the peritoneal covering of the uterus. In that case he did a panhysterectomy besides a double oophorectomy. I think we have all seen chocolate cysts. At Asbury Hospital the pathologist told me that fifteen cases were operated upon in the last year and I would estimate probably 125 or 150 are operated upon each year in Minneapolis.

An interesting experiment was done on the eye of a monkey by Cullen. Endometrial tissue was implanted in the anterior chamber and its development was watched. It was found that blood appeared in the anterior chamber about three hours before menstruation, indicating again that this misplaced tissue does respond to hormonal action even though remote from its original position.

DR. T. H. SWEETSER: I wish to add to the discussion the observation that the ureter is quite liable to damage during operations for endometriosis in the broad ligament. The margins of the endometriosis are ill-defined, hemorrhage is liable to be quite troublesome, and in dissecting down to the lower margin of the hemorrhagic tissue one reaches the plexus of veins at the side of the cervix and is quite liable to clamp the ureter. I have recently been asked to examine urologically one patient whose ureter had been thus damaged with resultant suprapubic urinary fistula. Nephrectomy was finally necessary to obtain a cure.

TERATOMA OF THE TESTICLE: HINMAN OPERATION

Report of a Patient Cured Four and One-half Years Following Radical Surgery Removal

LAWRENCE M. LARSON, M.D., Ph.D., F.A.C.S.

IN the treatment of malignant tumors of the testicle, one has at his disposal three methods. These are as follows:

1. Simple castration.
2. Radical operation in which the testis and its lymphoglandular drainage areas are removed.
3. Roentgen therapy either alone or in combination with the above described methods.

Regarding the first possibility, namely simple castration, it is evident that this method of treatment is not in accordance with the principles of surgery of cancer as applied to other parts of the body. No account is taken of the fact that these tumors commonly metastasize early into the retroperitoneal and aortic region and cure of this lesion cannot be expected in any large percentage of cases without removal of these lymph-bearing tissues.

The second method, radical operation in which the testicular tumor along with the lympho-glandular drainage area is removed at the same time, is a procedure which should and does give much better end results. This has proved to be the case, according to statistics, in a large number of individuals who have been operated for this disease. Furthermore, radical operation such as that recommended by Hinman is not much more dangerous than simple castration and experience has likewise shown that the technical difficulties are not great. The lymphatic drainage area of the testicle has been carefully worked out so that it is possible to excise with anatomical accuracy the region in which metastases are known to occur.

The third possible method of treatment has probably the most to recommend it of any of the other methods. Roentgen therapy in combination with surgical excision of the tumor has proved to be unusually efficacious in a certain group of these tumors, since it is a well-known fact that some of them are highly radio-sensitive. Roentgen therapy alone should probably be reserved for those cases in which it is possible to demonstrate clinically the presence of metastases in the regional lymph nodes. At any rate it is no doubt better to use this combined method in most cases.

Hinman, in 1933, reviewed a large number of cases of malignant testicular tumors with the purpose in mind of determining end results and found that approximately 15 per cent were cured by simple castration, and there were 30 per cent cured by the radical excision of the tumor with its lymph drainage area. The most favorable group of cases he found were those in which no metastases were demonstrable and in whom radical operation was done. Of this group of thirty-six cases, eighteen were living and well four years after the operation. Thus it is evident that even if no metastases are demonstrable clinically, radical removal of the lymph-bearing fascias is certainly worth while.

Pathologically, tumors of the testis are usually divided into two types, the seminoma and the teratoma. Both are highly malignant. They metastasize early to the primary lymphatics as well as to the lungs, liver and other organs. The immediate type of cell in these tumors still remains uncertain although the origin may be the connective tissue, the epithelial tissues or there may be a mixed type of tumor having components of both. Regardless of the origin of these tumors they must all be regarded as malignant. Clinically they all act similarly. The seminomas have been said to be more radio-sensitive than the teratomas, but this is not a constant observation so that roentgen therapy should be used in most of them either alone or in combination with surgical excision.

This patient was nineteen years of age when first seen in May 1933. He had always been in excellent health and had had no operations except for tonsillectomy in childhood. The history of his present illness goes back three or four months when he first

noticed enlargement and pain in his left testicle. These symptoms gradually increased in severity although at no time did he notice any loss of strength. He had had no loss of weight and by wearing a suspensory he has been entirely comfortable. During this four months period he thinks the left testicle had slowly and gradually enlarged but he paid little attention to it.

Physical examination: He is in apparent good health. He is five feet eleven inches tall, weighs 170 pounds, his color is good, and his muscles were all in unusual excellent condition. His entire physical examination was negative except for the left testicle. The latter was two to three times normal size and was surrounded by a fluctuant sac which apparently contained a small amount of fluid. Through this sac could be felt an ovoid tumor which involved the entire testis. The outline of the tumor could be distinctly made out and it was quite smooth with the exception of a few irregular areas in the upper and medial portions. The consistency of the mass was very hard and it was freely movable within the sac. It was not especially tender. The mass did not transmit light and no fluctuation could be made out. The epididymis could be distinctly made out in its usual position and the spermatic cord with the vas deferens could be readily palpated. The skin of the scrotum was freely movable throughout.

June 3, 1933 operation was done under gas anesthesia. A high left inguinal incision was made, the testicle delivered from the scrotum and simple castration was done. The spermatic cord was divided between clamps by cautery after it was dissected free, and the clamp was left on the proximal portion of the cord for traction. Immediate frozen section of the tumor mass was made and the report by the pathologist showed it to be a highly malignant teratoma. The patient was then placed partially on his right side and partially on his back, somewhat similar to the position for exploration of the kidney except the position was a bent dorsal-lateral one. A pad was placed under the left costal margin and the left knee and hip were slightly flexed with the right leg straight. The incision was then extended upward so as to follow the course of the iliohypogastric and ilioinguinal nerves, thus avoiding cutting them. It was carried as high as the tip of the 12th rib to which it ran somewhat parallel. The fascia of the external oblique muscle was next divided starting from the external ring and the muscle bundles then split as they paralleled the course of the incision. The internal oblique, the transversalis, and the latissimus dorsi muscles were divided also in the line of the incision. The ilioinguinal and iliohypogastric nerves were carefully avoided. The peritoneum was next encountered. Beginning in the iliac fossa this was retracted medially stripping it as far as the iliac vessels and the bladder. Here it was necessary to carefully avoid carrying the spermatic vessels and the ureter along with the peritoneum. These structures should be left behind on the surface of the psoas muscle. The spermatic cord was isolated and traction put on it so as to facilitate this dissection.

The vas deferens was then divided where it disappears behind the bladder. Next the peritoneum was further stripped back so that the iliac vessels and the aortic bifurcation identified, thus further exposing the retro-peritoneal tissues. The ureter was carefully avoided overlying the psoas muscle and the peritoneum stripped away as high up as the renal pedicle. The peritoneum was then pulled laterally and maintained in this position by retractors. The lymphatic tissues were then removed from the iliac vessels about the aortic bifurcation and along the pre-aortic area. There was a considerable mass of lymph tissue in this region extending up as high as the kid-

ney pedicle. A few small metastatic glands were encountered along the aorta and trauma to these tissues was avoided. The spermatic cord along with the lymph-bearing tissues described were then removed in one piece. Traction on the clamp attached to the spermatic cord was of considerable help in identifying the tissues to be dissected. Drainage of this large lymphatic area was then made by means of several Penrose soft rubber drains through the lower angle of the wound. Closure of the muscles in the lower part of the incision were made as for hernia.

The tumor measured 8x7x4 centimeters in diameter and it was solid yellowish in color with a few small cystic areas. The tunica vaginalis and the epididymis were not involved and could be identified. There was a small amount of compressed testicular tissue at the lower pole of the tumor and a number of hemorrhagic areas throughout the mass. Microscopically the cells resembled those of carcinoma interspersed with lymphoid stroma. There were many areas of necrosis and hemorrhage and a few smooth muscle bundles could be identified. The diagnosis was teratoma of the testis.

The postoperative course was uneventful. The incision drained considerable serum for about ten days and on the fourteenth day the patient was allowed to go home. As an additional therapeutic measure roentgen therapy was instituted three weeks postoperatively by Drs. Allison and Hanson, who gave him large doses over the entire lower abdomen. About six months after the operation he joined the Civilian Conservation Corps where he stayed in a camp in Northern Minnesota for a year and did all the hard work that was required of him. His strength since the operation has returned to normal. After leaving the CCC's he obtained work as a mechanic and has continued this work since without interruption. He has been examined about twice yearly since the operation, the last time two weeks ago, and at no time has there been evidence of recurrence or metastasis of the tumor.

Discussion

DR. GILBERT COTTAM: Dr. Larson has entered into the technic of the operation so thoroughly that it is unnecessary to deal with that phase of the subject. I would like to say a few things about the incidence of these tumors. The experience that any one of us has is so slight we cannot talk of any statistics derived from our own work. Probably only a half dozen men in this room have ever seen a teratoma of the testicle but any one of us may see one tomorrow morning. There are two things that I think we might consider in regard to the matter of the rarity of them and the only way we can get at it, of course, is by the aggregate experience of others. Hamilton Bailey of London has recently published a monograph which is highly valuable in this connection; it is a compact little work in which he has dealt quite freely with the statistical side of this subject. I will take the liberty of quoting one or two things that he mentions which I think are very interesting. From a large number of assembled individual cases he has arrived at the conclusion that 58 per cent of all malignant tumors in the male are of the testicle but, on the other hand, the Mayos have seen, in nine years, 155 cases so you see in a large volume of work like they have one runs against a fairly large number of cases.

Teratomas, according to another set of statistical figures, constitute about one-half of the malignant tumors of the testicle. The other half are carcinomatous seminomas which the French observer, Chevasse, has described and named; and one per cent are sarcomas.

In the diagnostic field there is one feature that is dwelt on particularly and that is the early rapid growth

of teratomas as compared with carcinomas. The estimate is made by Bailey that when a man develops a teratoma, he is apt to come in for medical advice within six months after he has first noticed it, whereas in a carcinoma the interval is apt to be a year.

As regards metastasis, an American observer, Ferguson, has collected sixty-nine cases and he has found metastases in the supraclavicular nodes in six, in the mediastinum in eleven, in the pulmonary lymph nodes in thirteen and in the epigastric in thirty-nine. The operated percentage, Dr. Larson mentioned. Hinman had 100 cases but in the case of that one patient who died, it really was not an operative death. He died on the tenth day of pneumonia.

Now, what is the prognosis? Here again we come back to Hinman and we find, of the radical cases, his own operation, out of eighty traced cases, seventeen were alive after five years. In simple orchidectomy, with or without irradiation, 258 cases have been collected. Of these, only seventeen were alive after five years, so you see the percentage of good results appears much greater in the Hinman operation. Yet, I am told, Hinman himself is now lukewarm about his own operation, in view of the early and unpredictable metastasis to the opposite side in so many cases.

DR. KENNETH BULKLEY: At fairly regular intervals this question of malignancy of the testicle comes up and I never miss the opportunity to get up and bring up to date a case which I think has finally become rather well known in medical literature.

This case I reported originally in 1911 in *Surgery, Gynecology and Obstetrics*. It was that of an individual in the early forties whose wife had been repeatedly examined for sterility. No one had ever thought to examine him, although it turned out that he was a double cryptorchid. The man accidentally, while bathing, discovered a lump in his left lower abdomen. He was seen by Dr. Joseph A. Blake, recently deceased, and was operated upon by him in 1911, a large malignant intra-abdominal testicle adherent to small gut being found. A simple orchidectomy was done with removal of about a foot of small intestine with end-to-end anastomosis. No radical gland dissection was done, yet this man remained alive without further difficulty of any sort until about three years ago when he died from other causes. In those days deep x-ray therapy was unknown and this individual received no treatment whatsoever other than local excision. The excised testicle was pronounced by Dr. James Ewing to be a teratoma. In other words, this is a case of a malignant intra abdominal teratoma of the testicle which received a local excision only, no gland dissection, no deep therapy and yet the patient lived for some thirty years.

There are a number of points in regard to intra-scrotal masses which I believe should be brought out in this discussion. The diagnosis is, of course, important and is not always easy, inasmuch as in a case I operated on only a few days ago, the mass may prove not to represent a testicular malignancy but an old hydrocele with walls so thick that transillumination is impossible. Tuberculosis also must be thought of and of course syphilis of the testicle. As far as the type of malignancy is concerned, I cannot help but be convinced that all malignant tumors of the testicle represent teratomas. This was first brought out by Ewing. In the particular case to which I referred at the beginning of this discussion, some ten or a dozen blocks were made, all of them showing apparently a pure sarcoma. However, with the cutting of more blocks different types of malignancy were encountered showing the case to be one of a teratoma.

There is just one other point which I would like to emphasize, chiefly because it sustains the thesis that radical gland dissection is inadvisable and unnecessary.

It is not uncommon for an individual to present himself for examination totally unconscious that anything wrong within his scrotum is the cause of the mass in the left supraclavicular region. When the man so presents himself always examine carefully the contents of the scrotum. Sooner or later the vast majority of cases of a malignancy of either testicle present a metastatic node above the left clavicle. I have never seen or heard of one appearing on the right side. It is probably due to lymphatic drainage and the position of the thoracic duct on the left.

Summarizing this discussion I would like to emphasize, first, the importance of diagnosis; second, the high radio-sensitivity of these tumors, rendering gland dissection unnecessary, and third, the fact that they probably are 100 per cent teratomas.

DR. S. R. MAXEINER: I would like to add one more report of a case treated by the Hinman operation for embryoma of the testicle more than three years ago. The patient to date is apparently entirely well.

I would like to call attention to the research done by the Veterans Administration Facility at Hines, Illinois, with reference to the Prolan "A" and Prolan "B" as demonstrated in the urine by the Friedman test, and from a bulletin of January, 1934, I wish to quote as follows:

"While urine from normal males does not contain Prolan 'A' and/or 'B', urine from patients affected with teratoma contained from 50 to 50,000 mouse units per liter, depending upon the embryonal type of the tumor and the extent of the disease.

"Negative test results indicate: (1) No teratoma type tumor; (2) No active metastases of teratoma tumor; (3) That irradiation or surgical treatment of such cases has proven effective.

"Positive test results indicate: (1) Presence of a teratoma type tumor; (2) A recurrence of such a tumor; (3) Metastases from such tumor, whether the original tumor was removed or not; (4) The extent of the disease and the status in regard to treatment; (5) Serial tests at frequent intervals show the effectiveness of the treatment employed."

Our patient showed positive Friedman test before his operation. He has been given postoperative x-rays and although he has been checked regularly at intervals, the Friedman test became negative postoperatively and has remained negative to date.

TUMOR OF THE PARATHYROID WITHIN THE THYROID CAPSULE

J. M. HAYES, MD.

IN presenting this case I want to apologize to the Society for not having more definite information to confirm our suspicions. This was very interesting to me and I think I learned something from it, and hope some of you may profit by our mistakes.

The clinical symptoms, both before and after operation gave a picture which I wish I had the ability to present to you. Now I feel that we had a combination of hyperthyroidism and hyperparathyroidism present. We made a diagnosis of hyperthyroidism before operation but felt we were missing something.

The patient was a female, sixty-one years old. She had been treated for heart trouble, and a suggestion of hyperthyroidism had been made. She had tachycardia, marked tremor and all the symptoms that accompany exophthalmic goiter. She had a basal metabolic rate of plus 35 per cent.

On Lugol's solution she improved very much and her basal metabolism came to normal. Dr. Graves said her blood study would suggest Hodgkin's disease or glandular fever, but no other symptoms of these diseases were present. Even after taking Lugol's solution for three or four weeks she still had extreme exhaustion and pain all over her body, and especially, in the long bones. Before operation the patient was extremely depressed, got around with much difficulty, had a stooped, rapidly aging appearance. The slightest trauma on any of her bones gave extreme pain. In addition to these symptoms, she had typical signs and symptoms of exophthalmic goiter.

The pain in her bones and extreme exhaustion even after taking Lugol's solution puzzled us even when we were ready to operate. We should have x-rayed the bones before operation but did not. In fact, it is rare that a diagnosis of hyperparathyroidism is made before the bone begins to break down.

I did a thyroidectomy on her in June, 1935. At operation the gland generally gave the typical appearance of hyperplasia. The pathologist said the gland was one of hyperplasia with some small adenomata about 1 cm. in diameter. At operation I noticed one small nodule at about the level of the entrance of the inferior thyroid artery. I didn't think much of it at the time but later I recalled this did appear much the same as parathyroid tumors I had seen. Unfortunately I had just recently listened to a surgeon of considerable experience say that parathyroid bodies did not occur within the thyroid capsule.

The sudden and remarkable change in the symptoms after operation surprised every one who saw her. On the second day after operation she said she couldn't imagine so great a change taking place in any one in so short a time. The whole picture seemed to change very rapidly. She appeared cheerful and said the pain in her bones had all gone. She said she thought she could get up then and go to work. She did go to the poles and vote just one week after operation.

I have seen this sudden change take place after removing toxic adenomata but never after operating on an exophthalmic goiter. The adenomata were small and gave no evidence of degeneration, so we did not think they could account for the toxicity. We were therefore at a loss to account for this unusual, sudden change. About six months later when Dr. Lahey published his paper dealing with hyperparathyroidism and cited a case very similar to this, I came to the conclusion we had missed something here. I went back to find the specimen but it had been thrown away. The patient was perfectly normal by this time so x-ray of her bones revealed nothing. I know I have not proven to you yet that we did have a parathyroid tumor here, but I do know if I get another patient with similar symptoms I will at least think of a parathyroid tumor. Perhaps many of our degenerative bone conditions would be picked up if we recognized these symptoms earlier.

Discussion

DR. E. C. ROBTSHEK: I am very happy to have heard Dr. Hayes' report of this case, because it gives me an opportunity to bring out that which I think should be emphasized regarding the early diagnosis and treatment of parathyroid tumors. I dare say, there are only a few of us who have had much experience with the diagnosis and treatment of this condition. If you will recall, it is only about ten or

eleven years ago that the first operation on the parathyroid glands was undertaken, and thus you will realize that only a short time has elapsed in which any great amount of work could have been accomplished and much further study of tumors of these glands made. Only last year Dr. Frank Lahey of Boston stated that he had seen five cases of parathyroid hyperplasia or tumors and he cited the fact that he thought he had missed the diagnosis in many cases and felt sure that many others also have had such cases pass through their hands unrecognized. Personally, I believe that one of the reasons for this lies in the fact that we, as surgeons, do not begin to think of parathyroid pathology until we meet a patient with a palpable or visible tumor or nodule in the neck, or until we find what I term the end symptoms, rather than the beginning or initial ones, and, unfortunately, it is not until we see a patient with a pathological fracture, or a bone cyst, or a Von Recklinghausen lesion that our attention is attracted to the possibility of parathyroid pathology. Therefore, I have listed a few of the initial symptoms, in accordance with their percentage, as found by Gutman, Swenson and Parsons, who, in an analysis of 115 such cases, found the initial symptoms to be pain in the back or extremities in 72 per cent, pathological fractures in 28 per cent, bone swellings in 26 per cent, disturbances of gait in 24 per cent, muscle weakness in 22 per cent, gross deformities in 19 per cent, polyuria, polydipsia and marked loss of weight in 10 per cent, renal colic in 9 per cent, and nausea and vomiting in 8 per cent. Lahey also calls attention to possible hyperparathyroidism in any patient showing progressively developing round back, so often due to decalcification of the vertebral bodies. X-ray examination of the bones, especially of the skull, the spine, sacrum and the femora, is important and helpful in arriving at an early diagnosis. The only certain criterion, however, upon which a diagnosis of hyperparathyroidism can be made at the present time is a demonstration of a disturbance in calcium and phosphorus metabolism, (hypercalcemia and hypophosphatemia).

Now, as regards to the treatment of parathyroid tumors, I wish to state that there is only one accepted treatment and that is removal. No treatment with diet, no treatment with calcium, no treatment with hormones or with X-rays or any other known treatment is of any lasting benefit. Surgical treatment, however, should not be undertaken lightly, as it is not always as simple as one might expect. One reason for this is, as Dr. Hayes has pointed out in his case, that parathyroids vary. They vary in their size, from that of a green pea to a plum, they vary in number (normally there are four), they vary in their color, having been found of a pinkish hue, of a yellowish color as that of fat, to a dark color as that of liver, or the color of the thyroid itself, and they also vary in their location. Usually they may be found on the posterior and lateral aspects of the thyroid gland outside the capsule of this gland. They may, however, be found and frequently are, near and about the branches of the inferior thyroid arteries, and also about the superior arteries and their branches, or they may be found in the sulcus between the esophagus and the trachea, or found up as high as the pharynx, or as low as under the clavicle, or found deep in the anterior or posterior mediastinal spaces, which means that one must split or remove the manubrium in order to locate and remove them and besides they may be found within and part of the thyroid gland itself. With such variations in color and appearance, in size and location, plus the fact that one may mistake an aberrant or an accessory thyroid, a piece of thymus, or a hemolymph gland for a parathyroid one, it is essential that a competent patholo-

gist be present at the operating table, in every operation undertaken for this condition, in order that a frozen section of a portion of the removed tissue may be immediately examined and accurately diagnosed.

To emphasize all of what I have said, and to present it in a much clearer manner than I could hope to express, I will conclude by reading you the summary of an article by E. D. Churchill and Oliver Cope, taken from a paper read by them at the last International Congress of Surgery, reporting their results in thirty cases of parathyroid disease, and published by them in the *Annals of Surgery*, 1936:

1. The corner stone of successful surgery of the parathyroids is a positive diagnosis.
2. An "exploratory operation" to confirm or disprove a doubtful diagnosis has little or no place in this field.
3. The findings of the laboratory are more exact than the dissection of the surgeon, and there is no point in the operation at which the operator may lay down his scalpel and find comfort in having disproved the diagnosis. Even the demonstration of four normal parathyroid bodies is not adequate because there remains the possibility that a small adenoma of a fifth gland lies tucked away in some inaccessible region of the mediastinum. A positive diagnosis is therefore a challenge to the skill and patience of the surgeon and when these have been exhausted in a fruitless search for an adenoma, the operator is privileged to say "the tumor cannot be found," but not "the tumor does not exist."

As to tumors of the parathyroid, I am sure you are familiar with the fact that adenomas are the most frequent type, cysts much less frequent and carcinomas rare.

DR. R. C. WEBB: A parathyroid tumor so closely resembles a thyroid adenoma that one should not apologize for not recognizing a parathyroid tumor. The case of hyperparathyroidism which I operated upon in January, 1934, and later presented before this society, I had scheduled for operation as hyperparathyroidism and there were several surgeons present, all of whom were experienced in thyroid surgery. When the tumor was exposed we were unable to assure ourselves that it was the source of the patient's disease until we saw the microscopic section. I am sure that Dr. Hayes should not feel apologetic for not recognizing the tumor in his case of suspected hyperparathyroidism. In my case the tumor was palpable preoperatively. Although the tumors are frequently located within the thyroid gland, they are usually situated outside the thyroid gland and are frequently palpable.

For several years it has been known that parathyroid tumors may be found within the thyroid gland. When Dr. F. H. Lahey discussed my paper at the 1934 meeting of the Western Surgical Association he called attention to eight cases in his own experience in which the parathyroid adenoma was discovered within the thyroid itself. (*MINNESOTA MEDICINE*, October 1935, page 669.)

The first case of hyperparathyroidism reported in 1926 by Mandl has reappeared in the literature due to a recurrence eight years later. I still have my patient under observation, and there is at this time no evidence of recurrence. She is of healthy appearance and has none of the symptoms of hyperparathyroidism. She does have a nephritis which may have no relation to the parathyroid disturbance.

DR. J. M. HAYES: In answer to Dr. Webb, I will repeat that the patient had typical symptoms of hyperthyroidism and it was only accidentally that the parathyroid tumor, if it was such, was removed.

I have presented this with the hope that sometime

we might make a diagnosis of parathyroid tumor before the patient sustains a pathological fracture and the x ray must be brought in to make a diagnosis for us.

BENIGN TUMOR OF THE STOMACH

MARTIN NORDLAND, M.D.,

THIS case is presented because of its rare surgical incidence. According to Hunt, the incidence of benign tumors of the stomach depends on whether the material is determined from autopsy or surgically. Surgical incidence is about .5 per cent to 5 per cent.



Fig. 1. Specimen of fibroma resected from the stomach wall.

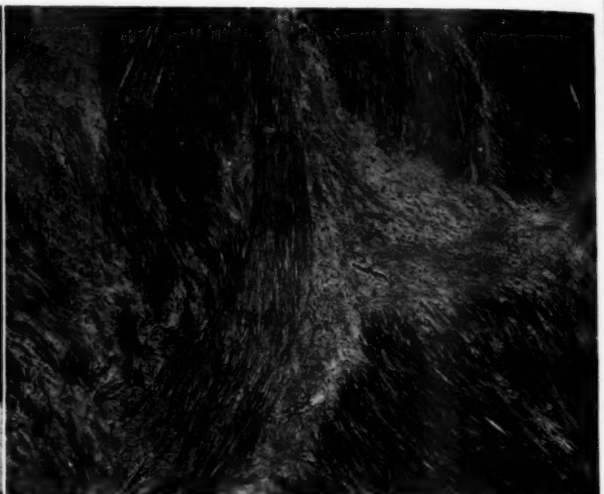


Fig. 2. High power microphotographs of benign fibroma of the stomach.

In autopsy material, about 5 years ago, in the Department of Pathology, University of Minnesota, Rigler and Erickson, in investigating the records of 6,742 autopsies, found 187 gastric neoplasms of which 138 were malignant and 47 benign, an incidence of benign tumors of 26 per cent of all gastric neoplasms. Therefore, while benign tumors of the stomach are not uncommon, those that cause clinical manifestations are infrequent.

Hunt has further classified the origin of benign tumors of the stomach from three sources:

1. The epithelium.
 - (a) Papilloma.
 - (b) Adenoma.
2. Those from the connected tissues and vascular structures.
 - (a) Lipoma.
 - (b) Fibroma.
 - (c) Myxoma.
 - (d) Angioma.
3. Those from the muscular structures.
 - (a) Myomas.
 - (b) Neuromas.

Of the latter group, those arising from the muscular structures are the most frequent and account for 60 per cent of all benign tumors of the stomach. Thirty per cent of this class of tumors have an epithelial origin. In a series of Judd and Hoerner, including 50 cases, 72 per cent were of muscular origin.

Most benign tumors of the stomach are symptomless and when symptoms occur, they are bizarre. There may be bleeding, massive or otherwise, with tarry stools and anemia and intermittent pyloric obstructions.

There are no clinical characteristics of benign tumors of the stomach. Usually they are not palpable. They

can be confused with gastroduodenal disease because of anemia, bleeding and gastric motility. They are usually recognized by x-ray.

1. The filling defect is usually central rather than marginal.
2. The outline of the gastric shadow is usually preserved.
3. Spasm as in ulcer and cancer is absent.
4. Peristalsis is uninterrupted.

Case Report

The patient was a married woman, fifty-eight years of age, who presented herself with a typical history of recurrent cholecystitis and cholelithiasis. She had had several spells of gallstone colic over a period of four years with intervals varying from two weeks to six months. She complained that most of this time she had had varying degrees of indigestion. The last attack occurred about three weeks before admission to the hospital. X-ray study of the gallbladder revealed a non-functioning gallbladder but no evidence of stones. Because of the typical history of gallbladder trouble no preoperative x-ray examination of the stomach was made. There was nothing important in the history concerning the patient's past illnesses.

The patient was operated upon on March 26, 1936. The abdomen was opened through a high right rectus

MINNESOTA MEDICINE

incision and exploration of the abdominal contents revealed a thin walled gallbladder which emptied rapidly. The organ was apparently normal. On examination of the stomach a mass the size of a walnut was revealed on the anterior wall near the pylorus and close to the greater curvature. The mass was firm and seemed to be in the wall of the stomach proper. The pylorus was partially obliterated. The appendix was relatively normal with a few adhesions to the cecum near the base of the appendix. The mass described was excised and a pyloroplasty was performed. The wound was closed in three layers of sutures using interrupted linen sutures in the serosa. This procedure was followed by a typical appendectomy and the abdomen was closed in the usual manner.

The laboratory report by Dr. M. I. Smith, Pathologist, Northwestern Hospital: Specimen is an encapsulated tumor from the wall of the pylorus, 2.5x2 cm.; it is slightly yellowish and moderately soft. Microscopic sections show a leiomyoma with some chronic inflammation. The center is rather cellular.

The patient made an uneventful recovery. She was seen on two occasions since the operation and, as far as I know, she is well at the present time.

Dr. Hunt, in a discussion of benign tumors of the stomach at the meeting of the Western Surgical Association at Kansas City in 1936, concluded that most of the cases are undiagnosed. He stated that 60 per cent of the tumors were removed by partial gastrectomy or pyloric resection. Because of difficulty of differentiating a benign from a malignant tumor, and because of hemorrhage, all benign tumors should be operated upon.

Discussion

DR. E. A. REGNIER: As Dr. Nordland mentioned, these tumors are more frequently found coincident with other abdominal diseases. The reports from the radiologists show a more frequent occurrence than would be indicated from surgical reports because many of these tumors are found in routine gastrointestinal studies. Likewise, autopsy specimens reveal a great many small leiomyomata that are of no clinical significance. If these small tumors, as well as polypae of the stomach, are included, the number of these tumors becomes increasingly high.

In a series of cases reported by Judd and Hoerner, 65 per cent of these tumors occurred in the pre-pyloric area in the stomach and 30 per cent in the mid-gastric region. The importance of these tumors lies in the fact that they may cause very severe symptoms, the chief of which is hemorrhage, and that they may degenerate into malignant growths. It is significant that in Judd's cases 46 per cent of these benign tumors were associated with peptic ulcer. In three cases the tumors consisted of pancreatic tissue.

The x-ray which you see before you shows a tumor in the pre-pyloric region which was diagnosed carcinoma by one of our radiologists. This man, sixty years old, complained of gastric distress for eighteen months. He had moderate secondary anemia with total achlorhydria. There had been a loss of weight of ten pounds in the last six months with gradual failing appetite. The physical findings were essentially negative. With the above history and the diagnosis of carcinoma of the stomach this man was explored. A tumor, 2 cm. in diameter, was found just above the pylorus. The tumor was excised and on the mucosal side there was a small crater ulcer. The pathologist reported it as a benign ulcer with a small tumor mass of pancreatic tissue above it. A pyloroplasty was

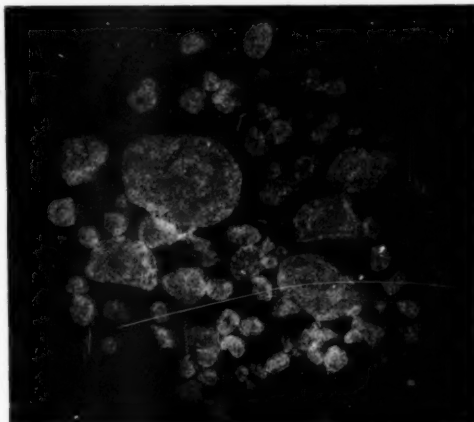
done. The man made an uneventful recovery and is well today.

These benign tumors lend themselves to surgical removal by conservative surgery such as resection of the tumor with pyloroplasty or by sleeve resection or some other form of partial gastric resection. Their early removal should be encouraged because of the incidence of malignancy associated with them.

PROSTATITIS WITH CALCULI

T. H. SWEETSER, M.D.

THE patient, a male veteran of the World War, forty-two years old, came to the hospital with complete retention of urine of twenty-four hours duration and with high fever and chills. He previously had had several attacks of complete retention and at other times had voided freely. He had been wounded during the war and also had contracted gonorrhea and syphilis at that time.



Rectal examination demonstrated a hard prostate containing stones which crepitated. The leukocyte count was 19,600, but the blood urea nitrogen was normal, the Wassermann was four plus, the urine contained some albumin, much pus, and a few erythrocytes. I had considerable difficulty passing the catheter even after passing bougies, but the intern had earlier passed a catheter without any difficulty. X-ray showed calculi filling the prostate and the prostatic urethra. A catheter was tied in place and preliminary treatment of his urinary tract and his syphilis was instituted.

Perirenal cystotomy was planned but finally a suprapubic cystotomy was performed instead. There was almost no trabeculation or thickening of the bladder wall. The bladder outlet admitted the finger. The prostatic urethra contained some small stones. The prostate, itself, was almost completely replaced by numerous stones, two of them being fairly large, and the mass of stones extended quite far back under the bladder trigone. The bladder outlet was dilated with the finger and the stones were removed. The shelf of remaining tissue between the prostate and the bladder was trimmed away and the prostatic space

packed with gauze. The wound was closed, the bladder being drained with a Feyer tube.

The stones were smooth and of a brilliant bronze color. On splitting some of them open this bronze shell was translucent and on microscopic examination apparently consisted of compressed prostatic substance (desquamated and disintegrated epithelium?). Within this shell was an inner zone of dense stone inside of which was a softer material of various colors. Microscopically the fragments of prostatic tissue removed showed chronic prostatitis. At several points minute calculi were seen in acini or ducts from which the epithelial lining had disappeared.

The man made a good recovery and had no further prostatic or urinary trouble. About eight or nine months later he suffered an acute decompensation of his heart and died with evidence of luetic aortitis and probably aneurysm.

* * *

The meeting adjourned.

HARVEY NELSON, M.D., *Secretary*.

PROCEEDINGS—MINNESOTA ACADEMY OF MEDICINE

(Continued from page 66)

process, appear to be quite uniformly better in the conservatively treated group, in which only a short cutaneous incision is made when a subcutaneous abscess is demonstrable.

The gynecologist was the first surgical specialist in the field to recognize the great virtues of conservatism in the management of acute infections. When its values are more generally appreciated, our results in the management of acute infections will be better. Were it not that the patient with a sore throat must swallow saliva, if not food and drink, several hundred times a day; or that patients with empyema, lung abscess or peritonitis must inhale and exhale some 25,000 times a day—if means were available to circumvent such necessary motion—undoubtedly the results of treatment of such infections would be much better. In the extremities, however, we have with the employment of plaster casts a satisfactory means of reducing motion to a minimum. The role of the surgeon in such infections is to provide as absolute physical and physiologic rest as he possibly can; to elevate the extremity concerned, in order to reduce filtration in the damaged capillary bed and to diminish existing edema. Only when pus is present should incision be made. Until specific immunologic or pharmacologic means are available with which to deal with pyogenic infections, we must continue to use those agents which we have learned from our own experience affect the issue most favorably.

The meeting adjourned.

A. G. SCHULZE, M.D.

Secretary.

*Learning without thought is labor lost,
Thought without learning is perilous.*

—CONFUCIUS.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

SURGICAL PATHOLOGY OF THE DISEASES OF THE NECK. Arthur E. Hertzler, M.D. Surgeon to the Agnes Hertzler Memorial Hospital, Halstead, Kansas; Professor of Surgery, University of Kansas. 237 pages. Illus. Cloth binding. Philadelphia: J. B. Lippincott Company, 1937.

PRIMARY CARCINOMA OF THE LUNG. By Edwin J. Simons, M.D. Pp. 263; 30 illus., 2 col. plates. \$5.00. Chicago: Year Book Publishers, 1937.

The purpose of this book is to provide the general practitioner with a compendium of the existing knowledge of a most important subject, for the sake of stimulating earlier recognition of the disease and thereby offering the patient his one and only opportunity for relief and cure by early, radical operation. To do this the author has literally combed the literature on the subject and has consulted freely with those of acknowledged standing who have given specialized attention to the various phases of the subject, added to his own personal observations and well grounded experience. The result is an amazing product of well directed industry and a keen example of the most useful type of textbook extant: a practical, scientific monograph.

This book should be on the desk of every practicing physician in the English-speaking countries. It contains the meat of the subject and nothing more. It is an earnest, honest effort to furnish much needed information on a very serious problem in clinical medicine; one that is becoming increasingly menacing with its known widening incidence. The author has done his work under circumstances of unusual difficulty and deserves warm commendation for the way in which he has surmounted every handicap. We hope to see the book become widely known—and read.

G. C.

PHYSIOLOGY IN HEALTH AND DISEASE, ed. 2. Carl J. Wiggers, Professor of Physiology, Western Reserve University. 1122 pages. Illus. Price, \$9.00. Philadelphia: Lea & Febiger, 1937.

A book on physiology that is authoritative, and at the same time written in an interesting style, is not common. Wiggers' "Physiology in Health and Disease" fulfills all the requirements of a handy reference book which one can consult when the question of the physiologic disturbance underlying any condition arises. It is a storehouse of physiological facts, and the reader is not led through a maze of controversial discussion that only makes for confusion. The reputation of the author lends great weight to statements made in the book. It should be on the book shelf of every practicing physician.

MAX H. HOFFMAN, M.D.

MINNESOTA MEDICINE